This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

5000386075

E. BIBL. RADCL.

C

1937 C.

6000366607S

E. BIBL. RADCL.

~~I. 4. 4. 35~~

C

1937 C.

A TREATISE

ON THE

CHEMICAL, MEDICINAL AND PHYSIOLOGICAL PROPERTIES

OF

CREOSOTE,

ILLUSTRATED BY EXPERIMENTS ON THE LOWER ANIMALS:
WITH SOME CONSIDERATIONS ON THE EMBALMENT OF THE EGYPTIANS.

BEING THE HARVEIAN PRIZE DISSERTATION
FOR 1836.

BY JOHN ROSE CORMACK,

MEMBER OF THE ROYAL MEDICAL AND ROYAL PHYSICAL SOCIETIES
OF EDINBURGH.

My taste for dead bodies and every thing like MUMMY is decided.
CARATHIS IN VATHEK.

EDINBURGH: JOHN CARFRAE & SON,

LONGMAN, REES, ORME, BROWN, GREEN AND LONGMAN, LONDON,
AND HODGES AND SMITH, DUBLIN.

MDCCCXXXVI.

TO

ROBERT CHRISTISON, M.D. F.R.S.E.

PROFESSOR OF MATERIA MEDICA

IN THE UNIVERSITY OF EDINBURGH,

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS,

PRESIDENT OF THE MEDICO-CHIRURGICAL

AND HARVEIAN SOCIETIES,

&c. &c. &c.

THIS ESSAY IS INSCRIBED

IN TESTIMONY

OF RESPECT FOR HIS DISTINGUISHED ATTAINMENTS

IN MEDICAL SCIENCE,

AND AS AN EXPRESSION OF GRATITUDE

FOR PERSONAL KINDNESS,

BY

THE AUTHOR.

PREFACE.

FROM the recent discovery of creosote, many interesting facts connected with its history are probably still undiscovered, and unquestionably very much remains to be done in the investigation of its medicinal properties, before we can form a proper estimate of its real value as a therapeutic agent. An attempt has been made in the following Essay, to collect all the information upon the subject which has been published in the Foreign and British Journals, and, at the same time, to state such farther details and observations as were known to the author.

Before describing the chemical and physical properties of creosote, it has seemed proper to give an account of the products of the destructive distillation of vegetable matter, and more particularly of those proximate principles which were discovered in the tars by Reichenbach. This appeared ne-

cessary from their being all generated along with creosote, and because their separation from it requires a variety of chemical manipulations, the *rationale* of which can only be properly understood by those acquainted with the relations which these substances bear to each other and to creosote.

Under the chemical properties of creosote naturally fell the consideration of its antiseptic virtues, and this suggested some remarks upon the embalming of the Egyptians, and the preservative power of peat-moss, from a belief that the Egyptian mummies and the fresh bodies found in peat water owed their preservation to creosote. To have entered fully into the consideration of these interesting topics would have been out of place, the subject having been announced for competition by a strictly medical society, by whom it was supposed any lengthened disquisition on these subjects would have been considered no additional recommendation of the paper which contained it.

The other subjects discussed in this Essay are intimately connected with medicine, although apparently but a disproportionately small part is devoted to this subject. It is conceived, however, that considerable light may be thrown upon the therapeutic properties of creosote, by attending to the effects produced by it when administered to the lower animals, and by comparing the ancient medicinal uses

of substances containing creosote with those purposes for which the drug itself has been employed in modern times. For although there is much rubbish in the old works on the materia medica, yet the remarkable coincidences in the present instance are by far too striking to be passed over in silence. Notwithstanding that the physiological properties of creosote were made the subject of a number of experiments, the author is aware that the account which he has been able to give of them is, in some respects, imperfect, which must in a great measure be attributed to the numberless inconveniences and difficulties attending such investigations, and from the slender assistance which could be derived from the observations of former experimenters. Should the farther elucidation of this interesting part of the subject not fall into abler hands, it is intended, at some future period, to endeavour to supply these defects, and correct such errors as may have been committed.

2, London Street,
March 1836.

CONTENTS.

PART FIRST.

CHAPTER I.

Page

Paraffine, Eupione, Picamar, Capnomor and Pittacal . 3

CHAPTER II.

Physical and Chemical Properties of Creosote . . 13

CHAPTER III.

On the Egyptian Embalming 20

CHAPTER IV.

Creosote the Antiseptic Principle of Peat . . . 33

CHAPTER V.

Preparation of Creosote—Its Adulterations . . . 35

PROPER-

REMOTE.—

OF CRE-

PART FIRST.

CHAPTER I.

PARAFFINE, EUPIONE, PICAMAR, CAPNOMOR, AND PITTACAL.

THE dry distillation of organic substances, consists in subjecting them, when deprived of moisture, to an elevated temperature. During this process, the elementary principles of the body operated upon, enter into new combinations, so that the products are the result of its destruction or decomposition by heat. Before the heat has been much raised, carbonic acid gas is given off, which is followed by carbonic oxide, water, acetic, and other acids, and lastly, come the oily and less volatile products. If the substance contain any nitrogen, part of it unites with some of the hydrogen, to form ammonia, and some of it may also combine with part of the carbon, and produce cyanogen. After a certain period, these compounds cease to be generated, and

there remains in the retort a quantity of carbon, uncombined with any other substance, which no increase of heat will volatilise.

It was when investigating this curious subject, that M. Reichenbach, the chemist of Blansko, discovered Creosote, and five other new substances, all interesting to chemists, and peculiarly important, on account of the useful purposes, in medicine or the arts, to which they have been already, or may at some future period, be applied. M. Reichenbach has published accounts of these new substances in Schweigger-Seidels Journal for 1830, and the subsequent years; and it appears proper, as introductory to this essay, to give a short sketch of what is known concerning them, viz. Paraffine, Eupione, Capnomor, Picamar, and Pittacal, the substances which he found associated with Creosote, and all of which are products of the destructive distillation of vegetable matter.

Paraffine is so called from its remarkable want of affinity for other substances, its name being derived from two Latin words, *parum*, and *affinis*. An account of it was first published in August 1830, by Reichenbach, in the German journals; but Dr. Christison, of this University, discovered it about the same time, and, early in 1831, read an account of it to the Royal Society of Edin-

burgh, ignorant of its having been previously described.[1] From his having first obtained the substance from the Petroleum of Rangoon, he gave it the name of Petroline; but as the discovery was first announced by Reichenbach, it has retained the appellation of Paraffine which he gave it.

It is a white, hard, crystalline substance, without taste or smell; but at a temperature of 111° F. it is a transparent and colourless liquid, of oleaginous consistence, and at a higher temperature distils unchanged, being volatilised in the form of white vapours. It is a non-conductor of electricity—resists the action of the strongest acids, and alcalis, and of chlorine, and potassium. The density of paraffine, in the solid state, is 870. It is easily dissolved at common temperatures by oil of turpentine, oil of tar, and naphtha. With the aid of heat it is soluble also in the fatty oils. It is very sparingly soluble in cold alcohol, and when water is added, the paraffine is precipitated. Boiling alcohol only dissolves by weight three and a half per cent. and on cooling, the solution thickens. When fused with camphor, naphthaline, and pitch no action ensues, but it unites with wax, stearine, and cetine, when treated in this way. The alcoholic solution does not affect the vegetable colours.

[1] Transactions, Royal Society of Edinburgh, vol. xiii. p. 118.

Paraffine burns without smoke, and equals wax in the whiteness and beauty of its light. It is ignited with much greater difficulty, but has the advantage of being more slowly consumed; and could a tolerably cheap and easy process be devised for procuring it, there is little doubt but that it would soon be in demand for the manufacture of candles, (to grace the saloons of the fashionable,) especially as the petroleum from which it may be obtained, is a very abundant natural production in some countries. Reichenbach has also suggested, that it might be used for making bougies, and greasing the wheels of machinery.

M. Jules Gay-Lussac, considers its atomic constitution isomeric with that of olefiant gas, which is composed of one atom of carbon, and two of hydrogen; but as neither the equivalent of Paraffine, nor the density of its vapour are known, this analysis is by no means satisfactory.

M. Reichenbach discovered *Eupione* at the same time as paraffine. Its name is derived from the Greek adverb ευ, and πιων, *greasy*, from its possessing this property. It is an oily substance, destitute of taste, colour, and odour, and is the lightest known liquid; its specific gravity being no more than 655. It retains its liquid form at 4° F.; boils at 339° F.; and distils unchanged, and with-

out leaving any residue. Like paraffine it is unaffected by the strongest acids and alcalis, and like it also burns with a clear light, without smoke or odour. It has also the advantage of being slowly consumed. These properties render it very suitable for lamps. Carbonic acid and water are the sole products of its combustion. It is insoluble both in cold and hot water. Alcohol is its best solvent: 33 parts of absolute alcohol at 63° F. dissolving 100 parts of eupione. With the assistance of heat, these two liquids unite in all proportions. Acetic ether dissolves about a third of its weight of eupione and sulphuret of carbon; and ether, naphtha, spirit of turpentine, oil of almonds, and olive oil, mingle easily with it in the cold. Eupione dissolves camphor, stearine and cetine, cholesterine, naphthaline, and paraffine, the action being much assisted by heat. Iodine is dissolved by it in the cold, with the production of violet vapours; and it also dissolves chlorine and bromine. These three substances are expelled by heat, and the eupione is left unchanged. It dissolves caoutchouc with great rapidity. It is an excellent substance for preserving potassium. It probably contains less carbon than paraffine, but differs from it in no other respect. However, its exact composition is as yet only conjectured.

Eupione is more abundant in the animal than in

vegetable tars. In the process of distillation it comes over along with the paraffine, and there is much difficulty experienced in separating them. It is best obtained by distilling the tar of bones. The first product must be repeatedly distilled from strong sulphuric acid, and then washed with an alcaline solution. After this has been done, the eupione remains associated with paraffine only; but to separate the two substances requires the most careful manipulation, unless the mass be subjected to a cold of zero, when the paraffine may be separated by crystallization. Eupione being more volatile than paraffine, may, with cautious manipulation, be separated from it by distillation from water, and if the impure product has been treated with alcohol, the process succeeds better, as eupione is more soluble than paraffine in this menstruum.

Picamar is the bitter principle of tar, whence it derives its name, *(in pice amarum.)* When applied to the body externally, it does not exert any peculiar influence. It is a thick, oily, colourless liquid, and has a peculiar, but not disagreeable odour. Its specific gravity is 1100. It boils at 545° F. It refracts light, but not so powerfully as creosote. In eupione it is not soluble, and in water very sparingly, but it is dissolved by alcohol, ether,

and creosote in all proportions. It has no action on test paper. Sulphuric acid dissolves it without decomposition. It is decomposed by nitric acid. When boiled in the atmosphere it acquires a light brown colour. A stream of chlorine produces the like change, thickening it at the same time. Its action with bromine is remarkable. If one part of bromine be added to four of picamar, a deep red brown colour is immediately produced, the temperature rises, and bromine is disengaged in the form of vapour. With iodine it forms a thick liquid mixture. It dissolves sulphur, phosphorus, and selenium. With potassa it forms compounds which are very sparingly soluble in alcohol. Soda, lime, baryta, and ammonia, form with it combinations which require for their solution a hundred parts of water.

This substance exists in the heaviest portions of the tar oil. In preparing creosote, it unites with the potassa used for purification, forming a crystalline compound, which, after repeated solutions and crystallizations in water, is decomposed by phosphoric acid, and then separated by distillation. To obtain the substance in perfect purity, it is necessary to conduct this last part of the operation *in vacuo*, on account of its tendency to unite with the oxygen of the atmosphere.[1]

Capnomor, is so called from the circumstance of

[1] Journal de Chimie Médicale, et de Toxicologie. October, 1834.

its being one of the constituent parts of smoke, its name being derived from two Greek words καπνος, *smoke*, and μοιρα, *part*. It is a colourless and transparent liquid refracting light nearly as powerfully as creosote. It has an agreeable but not very strong odour, somewhat resembling that of ginger. Its specific gravity is 0.975, and its boiling point 363° F.

It has no action on turnsole or turmeric. It does not absorb oxygen, either when cold or heated. When heated, it yields a good deal of smoke. In cold water it is almost entirely insoluble, but is dissolved in a small quantity of boiling water. It is soluble in alcohol, ether, oil of petroleum, carburet of sulphur, creosote, eupione, and picamar, but is almost insoluble in oxalic acid. With the assistance of heat it dissolves caoutchouc, which in cooling is deposited unchanged. Without heat it causes caoutchouc to swell.

When brought into contact with bromine and chlorine, hydracids and peculiar oily substances are formed, the temperature at the same time becoming elevated. If the capnomor contain the least trace of pittacal, the first bubbles of chlorine produce a violet colour, which passes into yellow after the capnomor has become saturated. In the cold it dissolves iodine, phosphorus, sulphur, and selenium.

Weak nitric acid produces with it a deep brown

colour, and in a more concentrated form decomposes it; a new crystalline substance being formed along with some acids. Sulphuric acid of sp. gr. 1.850 dissolves its own weight of capnomor without decomposition, but the temperature soon rises, and sulphurous acid vapours appear.

This substance exists in the heavy portions of the oil of tar, and is with difficulty separated from the other bodies therein contained. In the preparation of creosote, a considerable quantity of it is seen floating on the surface of the solution of potassa, when the other ingredients are dissolved. When collected it is combined with a little sulphur, to separate it from which, it ought first to be dissolved in sulphuric acid. The acid is then to be saturated with carbonate of potash, when the capnomor separates and may be obtained quite pure by distillation. It may be obtained from the animal, as well as the vegetable tars, and from the oil of Dippel.

Pittacal is a solid substance, of a fine blue colour, and may be fixed as a dye. Its name is derived from πιττος, *pitch*, and καλλος, *ornament*. It contains nitrogen, and seems to belong to the same class of bodies as indigo. Like that substance,

[1] Journal für Practische Chemie. Vol. i. Cacheir, as translated in the Journal de Pharmacie. May, 1835.

when rubbed, it acquires a metallic lustre. It is insipid, inodorous, and not volatile, is almost insoluble in water, but is so minutely divisible in that fluid as to pass through the filter along with it. In a few days however, it collects at the bottom, leaving the water quite colourless. It dissolves in the cold, without decomposition, in diluted sulphuric and hydro-chloric acids, but is insoluble in alcohol and ether. Nitric acid decomposes it. It is dissolved very copiously by means of acetic acid. Its acid solution has a red colour, which is converted into blue by the addition of an excess of alcali. Reichenbach states, that it is a more delicate test of acids and alcalis than turnsole. It has no action upon this substance.

With acetate of lead, hydrochlorate of tin, and acetate of alumina, it strikes a beautiful deep blue colour, somewhat resembling that of the violet. When the hydrochlorate of tin, or acetate of alumina is used, the colour is so permanent as to resist the influence of light, soap and water, ammonia or wine.

Reichenbach has not yet furnished us with the process by which he obtained this substance—a circumstance much to be regretted, as no other chemist seems to have procured it. Its presence in the oil of tar, however, can easily be shown by adding (after neutralizing the acid) a small quantity

of a solution of baryta. A beautiful blue colour is immediately produced, which in about five minutes assumes a blue shade, exactly similar to that of indigo.[1]

CHAPTER II.

PHYSICAL AND CHEMICAL PROPERTIES OF CREOSOTE.

CREOSOTE is by far the most interesting of all the products of destructive distillation, both on account of its chemical properties, and its numerous useful applications. It was first discovered by Reichenbach in impure pyroligneous acid, and afterwards in all the tars. Its name is derived from two Greek words κρεας, *flesh*, and σωζω, *I save*. In this part of the essay, its physical and chemical properties, the adulterations to which it is liable, and the best method of preparing it, are to be severally discussed.

Creosote is an oily fluid, transparent, and when pure, perfectly colourless. Its odour is very similar to that imparted to meat by wood smoke, but

[1] Journal de Chimie Médicale, et de Toxicologie. Oct. 1834.

is liable to considerable variation, dependent on the particular species of tar from which it has been obtained. It has a burning taste, followed by sweetness. At 68° F. its specific gravity is 1037. It boils at 397° F., and is not congealed at — 17° F. It burns briskly in the atmosphere, emitting a large volume of smoke. When dropped on paper it imparts a stain, but this disappears in the course of a few hours, and much more speedily if a gentle heat be applied. Creosote is a non-conductor of electricity. It unites with water in two different proportions; one of the combinations being a solution of one part of creosote in four hundred parts of water, and the other a solution of ten parts of water in a hundred of creosote. Alcohol, ether, carburet of sulphur, eupione, oil of petroleum, naphtha, and acetic acid, combine with it in all proportions. It has neither an acid nor alkaline reaction with test-paper, but it forms a number of interesting compounds, both with the acids and alkalis. Nitric acid acts upon it with violence, giving rise to a copious disengagement of red vapours. Concentrated sulphuric acid, in small quantities, gives it a red colour, but when more of the acid is added, this colour becomes black, and the substance formed is of a more viscid consistence than creosote; the sulphuric acid is decomposed, and some sulphur set free, which may be separated by distillation. It

has a strong affinity for all the organic acids, but, more especially the acetic, which may be said to be its specific solvent. It combines with chlorine, bromine, iodine, phosphorus, and sulphur. When chlorine unites with it, it first assumes a pale yellow, and then a deep reddish yellow colour, and a resinous substance is formed which contains no creosote. Phosphorus, and iodine are rapidly dissolved by it. In the cold it acts upon sulphur slightly as a solvent, but with the assistance of heat, about thirty-seven parts are dissolved, and a reddish brown liquid is formed, from which, on cooling, the greater part of the sulphur is deposited in the form of crystals. Concentrated creosote dissolves the oxide of copper, producing a chocolate brown colour. It reduces the oxide of mercury to the metallic state, and a resin is formed wholly destitute of creosote, as was formerly stated to be the case when this substance combines with chlorine. When potassium is thrown into creosote it disappears,—potash is formed, and gas is disengaged. The potash remains combined with the thickened creosote, but may be separated from it without change by distillation. Creosote forms two different combinations with potash, the one anhydrous and oily, and the other hydrated and of a white colour. The latter crystallizes in small pearly spangles. It forms similar compounds with soda. All the acids, even the carbonic, have

the power of disengaging it from its combinations with potash and soda. Creosote combines with lime and hydrate of baryta, forming white, unctuous substances, soluble in water; deprived of which, they exist in the form of pale rose-coloured powders.

Ammonia is soluble in creosote at all temperatures. A great number of the earthy and metallic salts are dissolved by creosote: some of them however, requiring the assistance of heat. In those cases in which heat is necessary, the salts generally separate on cooling in the form of crystals. This takes place with the acetates of soda, potash, ammonia, zinc, and lead, and the hydro-chlorates of lead and tin, &c. &c. It decomposes the acetate of copper, and then acts on the acid and base separately, forming a brown coloured liquid. It reduces the acetate of silver, the metal being precipitated in the form of a white powder, which assumes a metallic lustre under the burnisher. With the assistance of heat it dissolves the nitrate of silver. All the resins and their colouring principles are either decomposed or dissolved by creosote, some of them requiring heat; and there are no organic substances which it attacks so briskly. At a high temperature, it dissolves the colouring matter of indigo, which is precipitated again by alcohol. It forms a yellowish red

solution with cochineal, a pale yellow with *santalum citrinum*, [sandal-wood ?] a golden yellow with saffron, a yellow with madder, a deep red with dragons' blood, a red with Saunder's wood, and a deep purple with sorrel. With the aid of boiling, it dissolves caoutchouc. It has no affinity for paraffine.

The most important chemical property which creosote possesses is that of coagulating albumen, as on this depends its powerful antiseptic virtue. The action which takes place when albumen is coagulated by creosote is not exactly ascertained, but it may be explained according to the hypothesis of Fourcroy, by supposing that oxygen gas is absorbed. There can be little doubt that the antiseptic power which creosote possesses depends upon its coagulating albumen, for neither is muscular fibre by itself incapable of entering into a state of putrefaction, nor does albumen putrefy when coagulated. This property of creosote renders it applicable to a variety of useful purposes, and there is no better way of preserving anatomical preparations than by immersing them in a solution of creosote. M. Martin Solon has stated this in a memoir upon creosote, which he read last October, before the Academy of Medicine at Paris.

I have tried a number of experiments with it upon fresh meat, from which I have reason to be-

lieve that it might be very usefully employed in domestic economy. The meats which are intended to be prepared, ought to be immersed in a solution of one part of creosote in a hundred of water. In this solution they should remain from twelve to forty-eight hours, according to their size, when they are to be dried either in the sun or before a fire, and afterwards set aside for six or eight days, at the end of which period they will be found to have acquired the appearance, consistence, smell, and taste of the finest smoked meat. Bullock's tongues, mutton hams, haddocks, salmon, &c. &c. do well to be treated in this way. The tongues which I prepared in this manner equalled in delicacy of flavour the finest smoked rein-deer tongues so much prized by many epicures, and the haddocks were not inferior to those preserved with wood-smoke at the celebrated Finnan. Before leaving the subject of the domestic uses of creosote, it may be stated, that four drops of creosote added to a gallon of whisky, impart to it a peculiar flavour, very similar to that well known by the name of the *Peat-reek*. Dealers have long been in the habit of giving the peat-reek taste to whisky, with a view of making their article pass in the market as the much-prized product of the small Highland stills, by adding to it a minute quantity of the oil procured by the distillation of peat in close vessels. Since creosote has

been introduced into this country, it has been substituted for the peat-oil, and is at present extensively used for this purpose, both by dealers and in some private families, as I have occasion to know. The knowledge of these circumstances led me some time ago to undertake some experiments, with a view of discovering the best method of obtaining creosote from peat-tar, and I regret that I am as yet unable to give the result, but it may be safely stated, that it is peculiarly rich in this substance.

Birds poisoned with creosote resist putrefaction for a great length of time, and the bodies of animals may be mummified so as to keep in a sound state for an indefinite period, by immersing them in a solution of creosote in water, or by injecting a mixture containing creosote into the blood-vessels, and the embalmment may be rendered more complete, by filling the cavities of the cranium, thorax, and abdomen with the same solution. There can be little, if any doubt, that bodies preserved in this way would resist the destroying effects of time as effectually as the most ancient of the Egyptian mummies have done. I have in my possession the lungs of a dog which I poisoned with creosote three months ago, and they are as fresh at this moment as when cut out of the body, and still exhale a strong odour of the substance. Since the discovery of creosote, it has been justly considered the antiseptic prin-

ciple of wood-smoke, impure pyroligneous acid, and tar-water; and any one, who pays a little attention to the vast researches which have been made into the subject of Egyptian embalming, must be persuaded, that to it we are indebted for those strange relics of antiquity called mummies. As this is a subject of much interest, a separate chapter may with propriety be devoted to its investigation.

CHAPTER III.

ON THE EGYPTIAN EMBALMING.

THE accounts given us of the process of embalming, by Herodotus and Diodorus Siculus, are the most copious which we possess, and on a cursory perusal may seem clear and circumstantial, but they are in reality extremely defective and unsatisfactory. This is not to be wondered at, for we can easily imagine, that it was the most anxious endeavour of the embalmers to veil their sacred art in mystery; and in all probability, the various spices which they used, were employed chiefly for the purpose of concealing the odour of the mummifying drug.

Herodotus gives us the following account of the process: "In the most perfect specimens of their art, they draw the brain through the nostrils, partly with a piece of crooked iron, and partly by the infusion of drugs. They then, with an Ethiopic stone, make an incision in the side, through which they extract the intestines; these they cleanse thoroughly, washing them with palm wine, and afterwards covering them with pounded aromatics. They then fill the body with powder of fine myrrh, cassia, and other perfumes, except frankincense.[1] Having sewed up the body, it is covered with nitre for the space of seventy days, which time they may not exceed. At the end of this period it is washed, closely wrapped in bandages of cotton, dipped in a gum which the Egyptians use as a glue. It is then returned to the relations, who enclose the body in a case of wood, made to resemble a human figure, and place it against the wall, in the repository of their dead. The above is the most costly method of embalming. They who wish to be less expensive adopt the following method: They neither draw out the intestines, nor make any incision in the dead body, but inject an unguent, made from the cedar. After taking proper means to secure the

[1] Frankincense was not used, because it was consecrated to the gods.

injected oil within the body, it is covered with nitre for the time above specified. On the last day they withdraw the liquor before introduced, which brings with it all the bowels and intestines. The nitre eats away the flesh, and the bones and skin only remain. The body is returned in this state, and no further care taken concerning it. There is a third mode of embalming appropriated to the poor. A particular kind of ablution is made to pass through the body, which is afterwards left in nitre for the above seventy days, and then returned."[1]

Before offering any remarks upon this passage, it is better to add the account furnished by Diodorus Siculus: "They who have the charge of wrapping up and burying the body are such as have been taught the art by their ancestors. These give in a writing to the family of every thing that is to be laid out in the funeral, and inquire of them after what manner they would have the body interred. When every thing is agreed on, they take up the body, and deliver it to them whose office is to take care of it. Then the chief among them, who is called the Scribe, having the body laid upon the ground, marks out how much of the left side, towards the bowels, is to be incised and opened, upon which the Paraschistes, (so by them called), with an

[1] Herodot. Euterpe.—Beloe's Translation.

Ethiopian stone, dissects so much of the flesh as by the law is justifiable, and having done it, he forthwith runs away, might and main, and all those present pursue him with execrations, and pelt him with stones, as if he were guilty of some horrid offence, for they look upon him as an hateful person, who wounds and offers violence to the body in that kind of way, or does it any prejudice whatever. But as for those whom they call the Taricheutæ, (the embalmers), they highly honour them, for they are the priests' companions, and as sacred persons, are admitted into the temple. As soon as they come to the dissected body, one of the Taricheutæ thrusts up his hand through the wound in the breast of the dead, and draws out all the intestines but the veins and the heart. Another cleanses all the bowels, and washes them in Phœnician wine, mixed with divers aromatic spices. Having at last washed the body, they first anoint it all over with the oil of cedar, and other precious ointments, for the space of thirty days together; that done, they rub it well with myrrh, cinnamon, and such like things, not only apt and effectual for long preservation, but for sweet scenting of the body also, and so deliver it to the kindred of the dead, with every member so whole and entire, that no part of the body seems to be altered till it comes to the very hairs of the eyelids and eyebrows, insomuch as the beauty and

shape of the face seems just as it was before. By which means many of the Egyptians, laying up the bodies of their ancestors in stately monuments, perfectly see the true visage and countenance of those that were buried many ages before they themselves were born."[1]

There is so much manifest absurdity in the account of the method of embalming given by both of these authors, that we must look for light upon the subject, rather to the writings of those numerous antiquaries and travellers, who have in modern times, with so much care and industry examined mummies, and searched into the nature of the medicaments which have been found in them.

That the brain could have been extracted through the nostrils in the manner described, is barely possible; and the assertion, that clysters of cedria, or tar oil distilled from the cedar, brought away with them the bowels, is utterly preposterous; and the statement that mummies were placed in an erect position, is now known to be erroneous.[2] It would be easy to bring forward many proofs of the numerous inaccuracies of these credulous historians; but this is unnecessary, as it is sufficient to state, that all the attempts at embalming according to the methods given by them, have proved completely abortive,

[1] Book I. chapter vii.—Booth's Translation.

[2] See Travels of Belzoni and others.

shewing very clearly that they have omitted to mention some essential part of the process.

That historians should have been unable to get at the true art of the embalmers, is just what we would naturally expect from the peculiar care which the embalmers took to conceal their secrets from the world. Their chemical books were all written in secret characters, and deposited in the innermost recesses of their temples.[1] That chemistry was highly cultivated by the Egyptians, is evident from the allusions to the subject by various authors both ancient and modern, and Borrichius, among others, has written some learned, and now very scarce volumes, expressly on the subject.

Pliny speaks of their beautiful pigments;[2] and from what we in the present day have had an opportunity of observing, we know that their colours are of the most extraordinary durability, as is exemplified by finding the nails of mummies generally dyed of a reddish hue. Baron Denon, describing an ornamented mummy case, says, "De laps d'un moins quarante siècles, les couleurs en sont encore très vives; il y a du vert, du jaune, du rouge, et de l'orange."[3] And Pettigrew, speaking of mummy

[1] Volney informs us, that about the year 1780 upwards of one hundred volumes, written in an unknown language, were dug up near Damietta, which were immediately committed to the flames by command of the sheiks of Cairo. Vol. i. p. 285.

[2] Pliny, Lib. xxvi, xxvii. [3] Denon, T. i. p. 700.

Epistle xc.

derstood the smelting and working of gold and silver, is matter of common notoriety. It is sufficient to allude to the ornaments formed of these metals found in their tombs, and to their gold and silver statues, of which historians inform us; and we may also refer to the gold chain which Pharaoh placed around Joseph's neck. The knowledge of the science of chemistry, as well as that of many useful arts, was completely eradicated from among the Egyptians by the terrible burning of temples and libraries, which attended the invasion of their Persian, Ethiopian, and Roman foes.

It appears that all the substances found within mummies are of a resinous nature. That the mere introduction of these substances into the great cavities of the body, along with external lotions of Phœnician wine, &c., would answer the purpose of embalming, we know to be contrary to fact. Taking, however, the accounts given us by the historians already quoted, in connection with the examination of mummies by modern observers, we are enabled to form what seems a pretty correct opinion as to what was the real secret of the embalmers; and it is hoped that the following observations will make it apparent that creosote was the mummifying drug.

The grand omission in the description of the process given us by Herodotus and Siculus, is their

cases, says, "The colours with which they are decorated have retained their liveliness and beauty in a most surprising manner. The green is the only colour which appears to have faded; it is sometimes compounded with the blue, though blue is metallic, the yellow vegetable. The nature of the white, which is most durable, has not been discovered. The red is very brilliant. Red, blue, yellow, green, white, and black, are the colours to be found both on the cases and on the walls of the tombs; and it is stated in a note, that M. Champollion has observed a violet colour painted in the bas reliefs."[1] It is not a little singular, that in the coffin of a mummy described by M. Passalacqua, there was found a small vase containing a mineral matter, with which at the present day the Coptic ladies paint their eyebrows.[2] Seneca and other authors inform us that they made artificial gems of great beauty and value.[3]

But what is more to our present purpose is, that they were well acquainted with those operations in which fire performs the most important part. Zosmius, an ancient chemist of Panopolis, has given descriptions and representations of their retorts, and other vessels for distillation; and that they un-

[1] Pettigrew's History of Egyptian Mummies. Quarto, London, 1834, page 116.

[2] Ibid. page 107.

[3] Seneca, Epistle xc.

derstood the smelting and working of gold and silver, is matter of common notoriety. It is sufficient to allude to the ornaments formed of these metals found in their tombs, and to their gold and silver statues, of which historians inform us; and we may also refer to the gold chain which Pharaoh placed around Joseph's neck. The knowledge of the science of chemistry, as well as that of many useful arts, was completely eradicated from among the Egyptians by the terrible burning of temples and libraries, which attended the invasion of their Persian, Ethiopian, and Roman foes.

It appears that all the substances found within mummies are of a resinous nature. That the mere introduction of these substances into the great cavities of the body, along with external lotions of Phœnician wine, &c., would answer the purpose of embalming, we know to be contrary to fact. Taking, however, the accounts given us by the historians already quoted, in connection with the examination of mummies by modern observers, we are enabled to form what seems a pretty correct opinion as to what was the real secret of the embalmers; and it is hoped that the following observations will make it apparent that creosote was the mummifying drug.

The grand omission in the description of the process given us by Herodotus and Siculus, is their

cases, says, "The colours with which they are decorated have retained their liveliness and beauty in a most surprising manner. The green is the only colour which appears to have faded; it is sometimes compounded with the blue, though blue is metallic, the yellow vegetable. The nature of the white, which is most durable, has not been discovered. The red is very brilliant. Red, blue, yellow, green, white, and black, are the colours to be found both on the cases and on the walls of the tombs; and it is stated in a note, that M. Champollion has observed a violet colour painted in the bas reliefs."[1] It is not a little singular, that in the coffin of a mummy described by M. Passalacqua, there was found a small vase containing a mineral matter, with which at the present day the Coptic ladies paint their eyebrows.[2] Seneca and other authors inform us that they made artificial gems of great beauty and value.[3]

But what is more to our present purpose is, that they were well acquainted with those operations in which fire performs the most important part. Zosmius, an ancient chemist of Panopolis, has given descriptions and representations of their retorts, and other vessels for distillation; and that they un-

[1] Pettigrew's History of Egyptian Mummies. Quarto, London, 1834, page 116.

[2] Ibid. page 107.

[3] Seneca, Epistle xc.

derstood the smelting and working of gold and silver, is matter of common notoriety. It is sufficient to allude to the ornaments formed of these metals found in their tombs, and to their gold and silver statues, of which historians inform us; and we may also refer to the gold chain which Pharaoh placed around Joseph's neck. The knowledge of the science of chemistry, as well as that of many useful arts, was completely eradicated from among the Egyptians by the terrible burning of temples and libraries, which attended the invasion of their Persian, Ethiopian, and Roman foes.

It appears that all the substances found within mummies are of a resinous nature. That the mere introduction of these substances into the great cavities of the body, along with external lotions of Phœnician wine, &c., would answer the purpose of embalming, we know to be contrary to fact. Taking, however, the accounts given us by the historians already quoted, in connection with the examination of mummies by modern observers, we are enabled to form what seems a pretty correct opinion as to what was the real secret of the embalmers; and it is hoped that the following observations will make it apparent that creosote was the mummifying drug.

The grand omission in the description of the process given us by Herodotus and Siculus, is their

cases, says, "The colours with which they are decorated have retained their liveliness and beauty in a most surprising manner. The green is the only colour which appears to have faded; it is sometimes compounded with the blue, though blue is metallic, the yellow vegetable. The nature of the white, which is most durable, has not been discovered. The red is very brilliant. Red, blue, yellow, green, white, and black, are the colours to be found both on the cases and on the walls of the tombs; and it is stated in a note, that M. Champollion has observed a violet colour painted in the bas reliefs."[1] It is not a little singular, that in the coffin of a mummy described by M. Passalacqua, there was found a small vase containing a mineral matter, with which at the present day the Coptic ladies paint their eyebrows.[2] Seneca and other authors inform us that they made artificial gems of great beauty and value.[3]

But what is more to our present purpose is, that they were well acquainted with those operations in which fire performs the most important part. Zosmius, an ancient chemist of Panopolis, has given descriptions and representations of their retorts, and other vessels for distillation; and that they un-

[1] Pettigrew's History of Egyptian Mummies. Quarto, London, 1834, page 116.

[2] Ibid. page 107.

[3] Seneca, Epistle xc.

derstood the smelting and working of gold and silver, is matter of common notoriety. It is sufficient to allude to the ornaments formed of these metals found in their tombs, and to their gold and silver statues, of which historians inform us; and we may also refer to the gold chain which Pharaoh placed around Joseph's neck. The knowledge of the science of chemistry, as well as that of many useful arts, was completely eradicated from among the Egyptians by the terrible burning of temples and libraries, which attended the invasion of their Persian, Ethiopian, and Roman foes.

It appears that all the substances found within mummies are of a resinous nature. That the mere introduction of these substances into the great cavities of the body, along with external lotions of Phœnician wine, &c., would answer the purpose of embalming, we know to be contrary to fact. Taking, however, the accounts given us by the historians already quoted, in connection with the examination of mummies by modern observers, we are enabled to form what seems a pretty correct opinion as to what was the real secret of the embalmers; and it is hoped that the following observations will make it apparent that creosote was the mummifying drug.

The grand omission in the description of the process given us by Herodotus and Siculus, is their

cases, says, "The colours with which they are decorated have retained their liveliness and beauty in a most surprising manner. The green is the only colour which appears to have faded; it is sometimes compounded with the blue, though blue is metallic, the yellow vegetable. The nature of the white, which is most durable, has not been discovered. The red is very brilliant. Red, blue, yellow, green, white, and black, are the colours to be found both on the cases and on the walls of the tombs; and it is stated in a note, that M. Champollion has observed a violet colour painted in the bas reliefs."[1] It is not a little singular, that in the coffin of a mummy described by M. Passalacqua, there was found a small vase containing a mineral matter, with which at the present day the Coptic ladies paint their eyebrows.[2] Seneca and other authors inform us that they made artificial gems of great beauty and value.[3]

But what is more to our present purpose is, that they were well acquainted with those operations in which fire performs the most important part. Zosmius, an ancient chemist of Panopolis, has given descriptions and representations of their retorts, and other vessels for distillation; and that they un-

[1] Pettigrew's History of Egyptian Mummies. Quarto, London, 1834, page 116.

[2] Ibid. page 107.

[3] Seneca, Epistle xc.

derstood the smelting and working of gold and silver, is matter of common notoriety. It is sufficient to allude to the ornaments formed of these metals found in their tombs, and to their gold and silver statues, of which historians inform us; and we may also refer to the gold chain which Pharaoh placed around Joseph's neck. The knowledge of the science of chemistry, as well as that of many useful arts, was completely eradicated from among the Egyptians by the terrible burning of temples and libraries, which attended the invasion of their Persian, Ethiopian, and Roman foes.

It appears that all the substances found within mummies are of a resinous nature. That the mere introduction of these substances into the great cavities of the body, along with external lotions of Phœnician wine, &c., would answer the purpose of embalming, we know to be contrary to fact. Taking, however, the accounts given us by the historians already quoted, in connection with the examination of mummies by modern observers, we are enabled to form what seems a pretty correct opinion as to what was the real secret of the embalmers; and it is hoped that the following observations will make it apparent that creosote was the mummifying drug.

The grand omission in the description of the process given us by Herodotus and Siculus, is their

cases, says, "The colours with which they are decorated have retained their liveliness and beauty in a most surprising manner. The green is the only colour which appears to have faded; it is sometimes compounded with the blue, though blue is metallic, the yellow vegetable. The nature of the white, which is most durable, has not been discovered. The red is very brilliant. Red, blue, yellow, green, white, and black, are the colours to be found both on the cases and on the walls of the tombs; and it is stated in a note, that M. Champollion has observed a violet colour painted in the bas reliefs."[1] It is not a little singular, that in the coffin of a mummy described by M. Passalacqua, there was found a small vase containing a mineral matter, with which at the present day the Coptic ladies paint their eyebrows.[2] Seneca and other authors inform us that they made artificial gems of great beauty and value.[3]

But what is more to our present purpose is, that they were well acquainted with those operations in which fire performs the most important part. Zosmius, an ancient chemist of Panopolis, has given descriptions and representations of their retorts, and other vessels for distillation; and that they un-

[1] Pettigrew's History of Egyptian Mummies. Quarto, London, 1834, page 116.

[2] Ibid. page 107.

[3] Seneca, Epistle xc.

derstood the smelting and working of gold and silver, is matter of common notoriety. It is sufficient to allude to the ornaments formed of these metals found in their tombs, and to their gold and silver statues, of which historians inform us; and we may also refer to the gold chain which Pharaoh placed around Joseph's neck. The knowledge of the science of chemistry, as well as that of many useful arts, was completely eradicated from among the Egyptians by the terrible burning of temples and libraries, which attended the invasion of their Persian, Ethiopian, and Roman foes.

It appears that all the substances found within mummies are of a resinous nature. That the mere introduction of these substances into the great cavities of the body, along with external lotions of Phœnician wine, &c., would answer the purpose of embalming, we know to be contrary to fact. Taking, however, the accounts given us by the historians already quoted, in connection with the examination of mummies by modern observers, we are enabled to form what seems a pretty correct opinion as to what was the real secret of the embalmers; and it is hoped that the following observations will make it apparent that creosote was the mummifying drug.

The grand omission in the description of the process given us by Herodotus and Siculus, is their

cases, says, "The colours with which they are decorated have retained their liveliness and beauty in a most surprising manner. The green is the only colour which appears to have faded; it is sometimes compounded with the blue, though blue is metallic, the yellow vegetable. The nature of the white, which is most durable, has not been discovered. The red is very brilliant. Red, blue, yellow, green, white, and black, are the colours to be found both on the cases and on the walls of the tombs; and it is stated in a note, that M. Champollion has observed a violet colour painted in the bas reliefs."[1] It is not a little singular, that in the coffin of a mummy described by M. Passalacqua, there was found a small vase containing a mineral matter, with which at the present day the Coptic ladies paint their eyebrows.[2] Seneca and other authors inform us that they made artificial gems of great beauty and value.[3]

But what is more to our present purpose is, that they were well acquainted with those operations in which fire performs the most important part. Zosmius, an ancient chemist of Panopolis, has given descriptions and representations of their retorts, and other vessels for distillation; and that they un-

[1] Pettigrew's History of Egyptian Mummies. Quarto, London, 1834, page 116.

[2] Ibid. page 107.

[3] Seneca, Epistle xc.

derstood the smelting and working of gold and silver, is matter of common notoriety. It is sufficient to allude to the ornaments formed of these metals found in their tombs, and to their gold and silver statues, of which historians inform us; and we may also refer to the gold chain which Pharaoh placed around Joseph's neck. The knowledge of the science of chemistry, as well as that of many useful arts, was completely eradicated from among the Egyptians by the terrible burning of temples and libraries, which attended the invasion of their Persian, Ethiopian, and Roman foes.

It appears that all the substances found within mummies are of a resinous nature. That the mere introduction of these substances into the great cavities of the body, along with external lotions of Phœnician wine, &c., would answer the purpose of embalming, we know to be contrary to fact. Taking, however, the accounts given us by the historians already quoted, in connection with the examination of mummies by modern observers, we are enabled to form what seems a pretty correct opinion as to what was the real secret of the embalmers; and it is hoped that the following observations will make it apparent that creosote was the mummifying drug.

The grand omission in the description of the process given us by Herodotus and Siculus, is their

making no allusion to the application of heat; but that this formed an essential and constant part of the operation, we have good reason to believe; and of the certainty of this fact, M. Royer was perfectly convinced; for he says, when speaking of the application of heat, "Cette operation, dont aucun histoire n'a parlé, etoit sans doute la principale et la plus importante de l'embaumment."[1] It would be easy to bring forward a mass of evidence in support of this opinion were it necessary; but it is sufficient to refer generally to all the published accounts of the unrolling of mummies. With a view, however, of shewing that the degree of heat employed in the mummifying process was extremely great, we subjoin the following notices.

In an account of a mummy inspected at London in 1783, which was published in the Philosophical Transactions of the following year, we are told that the ribs were so *black and burned*, that they could with difficulty be distinguished from the pitchy matter in which they were embedded, and that the bones of the spine and pelvis were in the same state, only more burned. In a mummy which was brought from Egypt, by Baron Denon, it was observed that the humerus seemed to have been forced aside, and the cavity of the shoulder filled with bitumen, which

[1] Descript. de l'Egypte, p. 212.

bore evident marks of having been poured in while in a heated state.[1] Pococke, describing a mummy, says, "There were four folds of cloth over the head, the upper one being painted blue; under this there was a composition about half an inch thick, as I imagined, of gum and cloth, that was *burned* by the heat of the things applied to it;"[2] and in another part of the same description he says, "that the bituminous matter had penetrated into the diploe of the skull, but that little or no trace of it could be seen on the outer table of the bone." This was in all probability the effects of great heat upon the resinous matter within the body. Such a phenomenon might certainly be accounted for by supposing the blood-vessels to have been injected; but there does not seem to be sufficient ground for supposing that this was done. The whole muscular tissue of mummies is generally found impregnated with the embalming material. Belzoni, speaking of this impregnation, says, "What does not incorporate with the fleshy part, remains of the natural colour of the pitch, but that which does incorporate, becomes brown, and evidently mixed with the grease of the body."[3]

These facts, to which many more of the same na-

[1] London Lit. Gazette, No. 705, July 24, 1830.
[2] Pococke's Travels, vol. i. p. 230.
[3] Belzoni's Travels, vol. i. p. 260.

ture might be added, were it necessary, establish most clearly that there was a very strong heat applied to the body during the process of embalming.[1]

As supplementary to what has been stated, and as tending most powerfully to corroborate the views already expressed, we must advert to the account given of the embalming of Asa, in 2 Chron. xvi. 14. "And they buried him in his own sepulchre which he had made for himself, in the city of David, and laid him in the bed which was filled with sweet odours and divers kinds of spices, prepared by the apothecaries art; and they made *a very great burning* for him." This "*very great burning*" was clearly connected with the embalmment, and as the Jews acquired their knowledge of the method of preserving dead bodies during their residence in Egypt, there can be but little doubt but that the "*great burning*" formed also a part of the process as practised there.

Since it appears from the accounts of the ancients, and the investigations of modern mummologists, that the embalmers introduced large quantities of bituminous matters into the great cavities of the body, and as we have shewn that the application of

[1] Too intense a heat seems occasionally to have been employed. Pettigrew tells us that a female mummy which he unrolled, was "destroyed by the excessive heat with which the applications had been made, and that the bandages were literally *burnt to tinder*."

heat formed part of the process of embalming, it must of necessity have followed that creosote was generated, and propelled through all the tissues of the body. It may be stated then, as a summing up of what has been here said on this subject, that the application of such heat as would first dry up the body, and then decompose the tarry matters which had been previously introduced, and thus generate creosote, formed *the only essential part of the mummifying process*, that the spices and perfumes used were superfluous, and that the various other operations connected with the embalmments, of which we are told, were mere matters of idle ceremony, and were had recourse to in all probability, chiefly with a view of mystifying the notions which the vulgar might entertain of the embalmers' secret art. That the Egyptian embalmers were aware of the cause of the importance of the application of heat, is highly probable, from the advanced state in which chemistry was among them, and to which reference has already been made; but be this as it may, it does not render it less clear, that during the mummifying process, creosote was generated. It would be out of place to enter into lengthened discussion regarding the substances used in embalming, as it is sufficient for our purpose to state that the resinous and bituminous matters infinitely predominated over all the rest. It appears that the native mum-

mia or mineral tar was used as well as the vegetable. The cedria, or cedrium of Pliny, which he says was used in Egypt for embalming, unquestionably contained ready formed creosote, as all oils of tar do, for the process by which tar was obtained is almost identical with our own. "Pix liquida Europa e taeda coquitur, navalibus muniendis multosque alios ad usus. Lignum ejus concisum furnis undique igni extra circumdato fervet primus sudor, aquae modo fluit canali, hoc in Syria cedrium vocatur; cui tanta vis est, in Egypto ut corpora hominum defunctorum eo perfusa serventur."[1] The liquid called cedria seems to have been prepared from other trees as well as the great cedar, and appears to be a term sometimes merely denoting that the substance spoken of was possessed of preserving qualities, for from the great durability of cedar wood, it was the hieroglyphic of eternity.[2]

[1] Pliny, lib. xvi. cap. 21. In usum Delph. 1826.

[2] From this circumstance, and from its own intrinsic virtues, the leaves and binding of books were smeared with it, so that it became a proverbial expression when speaking of one whose fame deserved to descend to posterity—"*Cedro digna locutus.*"

CHAPTER IV.

CREOSOTE THE ANTISEPTIC PRINCIPLE OF PEAT.

Some consider the carbonic, gallic, and other acids, as the principal active antiputrescent agents which reside in peat, while others regard as such, the saline substances which it contains; and others, certainly with more probability, attribute its embalming power to the bituminous matters which are found in it. It is a very common occurrence to see a thin film of oil floating upon the surface of peat water; and in some mosses, this is very abundant, and every kind of bitumen has been found in peat, from the coarsest mineral tar, to the purest naphtha. Where these substances most prevail, the antiseptic power of the peat is strongest. That this depends upon the presence of creosote, there is every reason to believe. To enter into any discussion here, as to the manner in which the vegetable matter is decomposed when it becomes peat, would be out of place, especially as it could not be done without entering into a very wide field of controversy. It is enough, however, to state, that as these bituminous substances which are contained in it are antiseptic, and as bituminous matters in general contain creosote, there is

no difficulty in understanding why it should be creosote which renders peat antiseptic. That creosote can be derived from peat by destructive distillation, is also a collateral proof of the truth of this proposition, and that heat assists in the formation of peat, is not altogether a fanciful doctrine, although there are opposed to it many great names. The heat produced by the spontaneous chemical changes going on in the vegetable matter, is sometimes very great, and in consequence of them great peat mosses have been known to take fire. It is probable, that the more heat that has been in force during the formation of peat, the more bituminous it is, and the higher, consequently, are its antiseptic properties. An interesting fact, confirming this opinion, is, that in warm climates we find no peat, but in those situations, where it might be expected, we have in its place a highly bituminated substance—the asphaltum, and in those regions also, the liquid mineral matters, known by the several names of, oil of petroleum, naphtha, native mummy, &c. are far more abundant than in cold and temperate latitudes. There are no reptiles found in quick mosses, and they are also destitute of vegetation, and fishes and insects are never found in peat water. Like creosote, however, peat water may be advantageously used in medicine; and in some cases, living in an atmosphere impregnated with

peat smoke, is of great use in the counteraction or alleviation of disease; and there is some reason to believe, that all these effects are produced by the presence of creosote.

CHAPTER V.

PREPARATION OF CREOSOTE—ITS ADULTERATIONS.

SINCE Reichenbach published the process which he followed in preparing creosote, various improvements have been suggested by other chemists. He states, that his own attempts to abridge and simplify the tedious and troublesome process, which he has published in the German Journals, were quite unsuccessful, and recommends every one to adhere to the old method, as the substance procured by an abreviated process could not with safety be given internally. He adds, that at one time, he thought he had succeeded in procuring creosote by a simplified process, though not chemically pure, yet sufficiently so for medicinal purposes. Under this impression, he delivered some of it so prepared, to several practitioners; but he soon had reason to regret this, for he was inform-

ed, that in the cases in which it had been administered, the most frightful vomiting had ensued. This remarkable effect, he attributes to the presence of a peculiar emetic principle, of such activity, that when half a drop of it is put upon the tongue, vomiting is produced. The symptoms observed in the cases where it had been administered, were great nausea, flushing of the face, a fixed and projecting appearance of the eyes, and then followed repeated attacks of vomiting, which were succeeded during the remainder of the day by great prostration of strength. It is strange, and much to be regretted, that Reichenbach in his anxiety to warn the druggists against making use of an abbreviated process in the manufacture of creosote, should have entirely omitted saying a single word about the chemical and physical properties of this, till then, unheard of substance.[1]

But although Reichenbach has failed in making any improvements upon the process which he first published, other experimenters have not been so unsuccessful, and various chemists have devised processes of a more simple nature than his.

As far as I am able to judge, the best yet published, is that in the Annales de Chimie et Physique, of July 1835, by M. Koene. This gentle-

[1] Bulletin Gen. Therapeutique, Dec. 1833.

man attempted to get creosote from tar, according to the process of Reichenbach, but obtained so small a quantity, that he did not think it worth his while to purify it.

The process which he gives is as follows: The tar derived from pit-coal, is distilled in a retort provided with a long tube having a large mouth. Under this is placed a receiver. The oil which comes over first swims on water; and it is necessary to remove from time to time the products of the distillation, till an oil is obtained which sinks in water. When this is found to be the case, the product is collected. The heavy oil obtained during the distillation condenses not only in the receiver, but also in the tube of the retort, where it unites with the naphthaline, forming a buttery substance. By applying a gentle heat, the mass will drop into the receiver. The product is now allowed to remain in a cool place for some hours, after which it is pressed. The expressed naphthaline still contains oil, which is separated by heating it with its own weight of acetic acid till it melts. After allowing it to cool, the crystallized naphtha is pressed; and the acid adhering to the creosote is saturated with subcarbonate of potash. The creosote is now to be shaken for a quarter of an hour with phosphoric acid, the proportions being half an ounce of the acid to

twenty ounces of the oil. The mixture ought then to be agitated with its volume of water, and afterwards distilled with a graduated heat, care being taken to separate the oil which floats on the surface. The rectified oil is now to be dissolved in its own volume of a hot solution of caustic potash, of specific gravity 1.120. When it has been allowed to cool for half an hour, the supernatant oil is again removed, and the heavy oil again treated with the caustic potash—only a fourth part however of the solution being this time employed.

On uniting the solutions of potash, a slight excess of diluted phosphoric acid is added, and the free creosote which floats on the surface is separated. It is again rectified; and the first product, which is chiefly water, being rejected, the creosote comes over quite pure.

M. Koene recommends the substance thus prepared to be preserved in bottles, covered with black paper.

The protracted process required for obtaining creosote (and it must necessarily be a long and complicated one) will always make it an expensive drug, and consequently liable to adulteration or careless preparation. The quantity of creosote obtained by the above process by M. Koene from a "*litre*" (32 ounces) of tar was ten "*gros*," (drachms.)

M. Lémére, one of the first Parisian druggists who made pure creosote, obtained from 800 pounds of tar about six pounds of creosote.

M. Koene states, that he examined a substance which it was pretended was creosote, and found it to consist of the heavy oil of tar several times rectified. It merely contained a trace of creosote. It was obtained from the tar of pine. Having separated the creosote by means of the solution of potash, and removed the eupione by repeated distillations, he found the substance to be destitute of smell, of the consistence of almond oil, and with a specific gravity of 1.009. It became brown on exposure to light, was not so soluble in alcohol as creosote, and its alcoholic solution became less milky on the addition of water. Hydrochloric acid did not alter it. Nitric acid gave it a less intense yellow colour. Concentrated sulphuric acid, in the cold, gave it a brownish black colour, without total decomposition; but when this mixture was boiled, decomposition took place. As this oil dissolves very easily in creosote, it renders this species of adulteration very easy. The fraud may be easily detected by treating the suspected liquid with acetic acid, or a solution of caustic potash, and in either case the creosote will be dissolved, when the oil will remain unaltered.

Very analogous to this adulteration, is that with capnomor. This is not a fraudulent deterioration any farther than that it is the duty of those who make creosote for sale, to ascertain by experiment, before bringing their article into the market, that it is free from this, and every other impurity. From the similarity of this substance to creosote, both in chemical and physical properties, (as may be seen by referring to pages 10, 11, of this treatise), it is easy to account for the frequency with which it is found associated with the creosote of the shops. This is a circumstance worthy of the attention both of practitioners and druggists, as by a knowledge of the manner of putting the matter to the test, the latter may be prevented from paying the price of pure creosote for what is in reality a spurious article, and the former from being perplexed with the inefficacy of a drug which he believes to be identical with that which in similar circumstances he had employed with marked advantage.

The presence of capnomor in creosote may be recognized, *first*, by the less specific gravity of the suspected specimen; *second*, by adding to it acetic acid, when the creosote will be wholly dissolved, but the capnomor will be hardly at all acted upon; and *third*, by observing what takes place when it is added to a strong alkaline solution, in which creosote is soluble, but capnomor wholly insoluble.

The creosote made by Reichenbach is derived from beechwood tar; but a considerable proportion of that manufactured in this country is obtained, I believe, from the tar of the coal-gas works. It can easily be distinguished from that got from beech tar, by a peculiar, somewhat fœtid and ammoniacal odour. The creosote procured by Koene from pit-coal tar had more the smell of castor, he informs us, than of smoked meat, but was in all its chemical properties identical with creosote.

From creosote uniting with almond oil, it is probably sometimes adulterated with this oil, as the greater density of the fluid might easily pass unnoticed by the inexperienced. There is a peculiar principle which obstinately adheres to creosote, and which, from its combining with great avidity with the oxygen of the atmosphere to form a brown coloured substance, gives the substance a brown tinge; but the existence of this shade of colour is no reason to avoid giving it internally, as its presence does not seem to influence its therapeutic agency in any degree. At this moment there is probably none in any of the shops of this city which has not a decided brown tinge, and the only specimen destitute of it which I have seen, is one which I obtained from Dr. E. D. Allison, the druggist, last summer, which he received from the Continent, and which he believed to have been manufactured by Reichenbach himself.

Creosote was procured by Reichenbach in the following manner, from crude pyroligneous acid, at a temperature of 70° or 80° F. The acid is neutralized by the addition of sulphate of soda. This operation causes a quantity of oil to be separated, which, on standing for some days, is seen floating on the surface, and at this time a fresh portion of pyroligneous acid, and sulphate of soda is again separated. It is then saturated with carbonate of potash. A thick oil is separated, which is to be distilled with water; when this is done, a pale yellow coloured oil is obtained, which is to be frequently agitated with fresh portions of diluted phosphoric acid. The liquor is then left at rest for some time, after which it is treated with a fresh quantity of water, till there ceases to be any acid re-action. The liquid is now distilled with a fresh quantity of water charged with phosphoric acid, care being taken to cohobate from time to time. The colourless oil contained in the receiver, is now to be dissolved in a solution of caustic potash of a density of about 1·12, when the eupione which is on the surface is drawn off, and the heavier oil, which is chiefly creosote, is put into a shallow vessel, and left exposed to the action of the air until it becomes brown, or this part of the process may be hastened by gentle ebullition in an open vessel. This change of colour is owing to the oxidation of the peculiar substance already men-

tioned which it contains. The liquid is now saturated with sulphuric acid, and again distilled till a bituminous residue is left in the retort. The solution in the caustic alkali and the subsequent manipulations must be repeated until the oil ceases to become brown, on exposure to the air. In conducting all the distillations, it is necessary to guard against any drops condensing on the sides of the retort, as they might be decomposed by the action of the fire. By this method creosote may be obtained in great purity, but not with sufficient ease, nor in sufficient quantity, to recommend the process to the manufacturing chemist.

PART SECOND

HISTORY OF THOSE SUBSTANCES WHOSE MEDICINAL PROPERTIES SEEM TO DEPEND ON THE PRESENCE OF CREOSOTE. THE PHYSIOLOGICAL AND MEDICINAL PROPERTIES OF CREOSOTE.

CHAPTER I.

MUMMY, HUMAN AND MINERAL. THE MANTEY OF THE ARABS, CEDRIA, TAR, SOOT, EAU DE BINELLI, &c. &c.

From the great repute in which the mummified flesh of dead bodies has been held at various periods, and in almost every country, as a remedy for the very same diseases in which creosote has been recommended in modern practice, it seems proper to give a few historical details regarding this very curious subject—the more especially as this remarkable coincidence may be explained by the hypothesis already stated, viz. that in the embalming process creosote was generated, and propelled into every tissue.

Mummy seems to have been officinal under a variety of forms. In the Pharmacopœia Schrodero-Hoffmaniana there are given formulae for preparing tinctures and oils from this substance.[1] In the Pharmacopœia Augustana Reformata it forms part of a variety of powders, plasters, and cerates.[2] Olaus Wormius tells us that it was frequently taken in the form of powder, and that in this state it was administered in doses of half a drachm.[3] We are informed by Belon, that Francis the First was in the habit of carrying about his person a powder composed of mummy and rhubarb, to be used in case of his meeting with any accident from falls or otherwise.[4]

Mummy has been used in medicine from the earliest ages. It is probable that its virtues were discovered in the reign of king Feridu'n, who flourished, according to Sir William Jones, in the eighth century before Christ; or, according to others, about two thousand years before the Christian era.[5] It was very extensively prescribed by Emalgar, a famous Jewish physician, who flourished about 1100 A. D. (or, according to others, about 1300,) both for the Jews and Christians then in

[1] Geneva. Folio, 1687. p. 609.
[2] Dordrechti, 4to. 1772. pp. 163, 384, 392, 397, 402, 403, &c.
[3] Museum Wormianum. Folio, Amsterdam, 1655, p. 344.
[4] Observations de Plusieurs Singularités, &c. p. 261.
[5] Dict. Buchán Kútea, as quoted by Ouseley, Vol. ii. p. 481.

the east contending for the Holy Land.[1] From that time it became a favourite remedy all over the world with the professors of the healing art.

Avicenna recommends it in cutaneous diseases, fractures, abscesses, contusions, nausea, dyspepsia, hemoptoe, ulcerated lungs, palpitation of the heart, and a variety of other maladies.[2] Olaus Wormius praises it as a remedy in spasmodic affections, contusions, wounds, and in external and internal ulcerations. He and others speak highly of its efficacy in gangrene.[3] Lemery says, that it is "detersive, vulnerary, resolvent, a remedy against gangrene, strengthening, well adapted for contusions, and for preventing the blood from coagulating in the body."[4] And many other physicians of ancient note speak with great confidence of the therapeutic virtues of this drug.

Nowhere was it so much in vogue as in France, but in our own country it seems to have attained considerable celebrity. It has a place in all our old books on the Materia Medica. Hill gives us the following account of it.

"We have two different substances preserved for medicinal use, under the name of *mummy*, though both are in some degree of the same origin.

[1] Pettigrew, p. 7.
[2] De Viribus Cordis. Folio, Venete, 1608, tom. ii. 384.
[3] Mus. Wormianum, p. 344.
[4] Dictionnaire de Drogues Simples. Rotterdam, 1727, p. 362.

The one is the dry and preserved flesh of human bodies, embalmed with myrrh and spices; the other is the liquor running from such mummies, when newly prepared, or when effected by great heat or by damps. This latter is sometimes in a liquid, sometimes in a solid form."[1] Dr. James says, " Under the name of *mummy* are comprehended, first, the mummy of the Arabians, which is a liquament or concreted liquor, obtained in sepulchres by exudation from carcases embalmed with aloes, myrrh, and balsam. If this mummy could be procured right and genuine it would be preferable to the other sorts. The second kind of mummy is the Egyptian, which is a liquament of carcases seasoned with pissasphalt."[2]

Such then was the substance so much extolled by many of our ancestors two hundred years ago. Lord Bacon celebrates its power in stopping hemorrhage; he says, that " it hath great force in

[1] Hill's Materia Medica. London, 1751, 4to. p. 875.

[2] Pharmacopœia Universalis. London, 8vo, 1747, p. 512. This passage is cited merely as giving the commercial history of the drug, because its admission into James' work could not be considered as any proof of its having been much in repute when he wrote, as he has retained a multiplicity of preposterous nostrums, which were before his day discarded from regular practice. For instance, he says under the word *Homo*, " The officinal simples furnished from the parts of the human body, whilst alive, are the hair, nails, saliva, ear-wax, sweat, milk, menses, secundines, urine, dung, semen," &c.

staunching of blood; which, as it may be ascribed to the mixture of balmes that are glutinous, so it may also partake of a secret property, in that the blood draweth man's flesh."[1] Boyle also praises it as a drug.[2] We find various allusions to the use of mummies in medicine, by several of our old dramatic and other authors.

"The worms were hallowed that did breed the silk,
And it was dyed in *mummy*, which the skilful
Conserved of maiden's hearts."[3]—*Othello, Act III. Sc.* 4.[4]

Falstaff says,

"I had been drowned, but that the shore was shelvy and shallow, a death I abhor, for the water swells a man, and what a thing I should have been when I had been swelled—I should have been a mountain of *mummy*."

Merry Wives of Windsor, Act III. Sc. 5.

"But I'll have one, (a tomb,)
In which I'll lie embalmed, with mirrh and cassia
And richer unguents than the Egyptian kings,
And all this that my precious tomb may furnish
The land with *mummy*."

Muses' Looking-Glass, Act III. Sc. 1.[5]

[1] Sylva Sylvarum. Cant. x. 8, 980.

[2] Boyle's Works, Vol. ii. p. 451.

[3] Roquefort tells us that the bodies of young girls were considered most efficacious, and produced the greatest price. Pettigrew, p. 12.

[4] Entered at Stationers' Hall, Oct. 6th 1621.

[5] By Thos. Randolph. He died in 1634, at the age of twenty-nine, but the precise date of the play cannot be ascertained.

"That I might tear their flesh in mammocks, raise
My losses, from their carcases turned *mummy*."
Honest Lawyer.[1]

"Make *mummy* of my flesh, and sell me to the apothecaries."
Shirley's Bird in the Cage.[2]

"The Egyptian mummies, which Cambyses or time hath spared, avarice now consumeth. *Mummy* is become merchandize, Mizraim cures wounds, and Pharaoh is sold for balsams."
Sir Thomas Browne's Hydriotaphia.

Though mummy is now hardly, if at all known in European practice, it is at present, as Madden informs us, a favourite remedy with the Arabs. They mix it in powder with butter so as to form an ointment which they call *mantey*. This they esteem a sovereign remedy for ulcers, both internal and external.[3]

Mummy did not fall into disrepute from any want of faith in its virtues, but from the universal disgust created, when it was discovered that the European market was supplied entirely by a company of Jews, who prepared a species of mummy in Egypt with the common bitumen of the country,

[1] Pettigrew, in quoting this passage, erroneously ascribes the play to Shirley. It was published anonymously, but with the letters S. S. on the title page in 1616. At this time Shirley was only eight years old, being born in 1608. The author is unknown.

[2] This play was first published about 1632.

[3] Madden's Travels in Turkey, Egypt, &c. Vol. ii. p. 90.

and that for this purpose they made use of the bodies of criminals, of those who had died of the plague, or, in fact, of any upon which they could lay their hands.[1]

This was first announced to the world by Ambrose Paré, a French surgeon,[2] who made the statement upon the authority of Guy de la Fontaine, physician to the king of Navarre, who visited Egypt in 1564. He requested the principal Jew engaged in the traffic to shew him his mummy depository, which was readily complied with. When making some enquiries concerning the sepulture of the ancients, the Jew unhesitatingly informed him, that those mummies which he saw had all been manufactured by himself during the four preceding years, and were the bodies of slaves who might, for ought he knew, have died of leprosy or any other malignant disease, and he expressed astonishment, how "dainty-mouthed Christians" could eat dead bodies.[3]

In reference to this subject, Chambers says, "All that is sold in the shops, whether brought from Venice or Lyons, or even directly from the Levant

[1] Pettigrew, p. 11. Hill's Materia Medica, p. 875. Lemery's Dict. de Drogues Simples, p. 363.

[2] Ambrose Paré has written at great length against the use of mummy in medicine.

[3] Pettigrew, p. 8.

by Alexandria is fictitious, the work of certain Jews, who counterfeit it by drying carcases in ovens, after having prepared them with powder of myrrh, caballine aloes, Jewish pitch, and other coarse and unwholesome drugs."[1]

From this time the reputation of mummy seems to have been decidedly on the decline, and we find instructions given by various authors as to the manner in which the genuine mummy was to be discriminated. Lemery says, " Il faut choisir la mumie nette, belle, noire, luisante, d'une odeur assez forte, et qui n'est point desagréable ; on en tire par la distillation chymique beaucoup d'huille, et de sel volatil." But when he gives these instructions he states his conviction that what was imported into Europe was not the real mummy of the tombs. " Il ne faut pas croire que la mumie commune qu'on nous apporte, soit de *la veritable mumie d'Egypte*, qui ait eté tirée des sepulcres des anciens Egyptiens; celle-là est trop rare, et si l'on en a quelque partie, ou la garde dans des cabinets comme une grande curiosité."[2] It is expressly stated by various authors, that the medicinal powers of this substance were wholly to be attributed to the bituminous matters used in the em-

[1] Chambers' Encyclopædia. Article *Mummy*.
[2] Lemery, Dict. de Drogues Simples, p. 363.

balmment. "Mummy," says Hill, "has been esteemed resolvent and balsamic, but whatever virtues have been attributed to it, seem to be such as would depend more upon the ingredients used in preparing the flesh than in the flesh itself; and it would surely be better to give those ingredients without so shocking an addition."[1] And in the article Mummy in Nare's Glossary, we find it mentioned, that the Dean of Westminster, in his History of the Commerce, &c. of the Ancients, says, that "it was medicinal, not on account of the cadaverous, but of the aromatic substance."

Dioscorides applies the term *mumia*, (or, as some write it, *momia*,) to a species of native oil of tar or petroleum, which he describes in the following manner as translated by Serapion. "Mumia est in terris Apolloniae; descendit namque ex montibus, qui ducunt flumina cum aqua, et ejicit eam aqua fluminis in ripis, et est coagulata, et fit sicut cera, et habet odorem picis mixtae cum asphalto cum aliquo fœtore: et virtus ejus est sicut picis et asphalti mixtorum."[2] Many authors assert that the Egyptians embalmed their dead with the natural *momia*,[3] and it seems to be the general opinion

[1] Hill's Materia Medica, p. 876.

[2] De Simplici Medicina. Venice, 1503, p. 138.

[3] All Egyptian mummies were certainly not embalmed with the native bitumen, but the laborious investigations of Rouelle

that the Persian word *mùmià*, signifies mineral pitch, although some consider its primary meaning to be an embalmed or aromatised body.[1] There seems, however, to be sufficient reason for believing, that both the mineral and vegetable tars were employed by the embalmers.

The celebrity of the native mummy, in medicine, was very great, and it was applied to the very same purposes as the mummy of the tombs, and as creosote. Pliny says, that a mixture of this substance was useful in itch and mammary excoriations. "Est et pissasphaltos mixta bituminis pice naturaliter in Apollionatarum agro. Quidem ipsi miscent praecipuum ad scabiem pecorum remedium aut si fœtus mammas laeserit."[2] There was believed to be great diversity in the medicinal powers of the native mummy, dependent upon the place where it was obtained. Alluding to this, Pliny says, "Theopompus scripsit in Apollionatarum agro picem fossilem non deteriorem Macedoniâ inveniri."[3] In Sylvestre de Lacy's translation of the works of Abd'-Allatif, an Arabian physician of the twelfth century, we find the following notice of this remarkable substance. "La momie sort de source comme la poix minerale, la napthe, d'autres disent que la

and others seem to prove that it was extensively used. This is also the opinion of Kaempfer. *Vide* his Amœnitat. Exot. p. 520.

[1] Pettigrew, p. 1.

[2] Pliny, lib. xxiv. cap. 25.

[3] Pliny, lib. xvi. cap. 23.

momie est un varieté de poix minerale, et on la nomme *menstrues des Montagnes.*"[1]

Chardin tells us that though the Persians are acquainted with the mummy of the tombs, they set by far the highest value upon the native mummy, which they term moùmènéhy or moùmiahí. Kaempfer gave the preference to the native substance as a medicine, and believes that it was to be found in the bodies of those Egyptian mummies of antiquity who had been princes and illustrious men.[2]

Chardin describes it as a bituminous substance which exudes in minute quantities from the rocks, resembling shoemaker's wax in appearance, colour, density, and ductility; but states, that before it has dropped from the rock it is more fluid. It is destitute of odour, and resembles in substance the Egyptian mummy.[3] Those authors, such as Kaempfer and others, who have written at any length on this subject, describe two species of native mummy. The one is tolerably abundant in certain mountainous districts, especially in the territory of Lar and Darab, but is considered of little value compared with the product of the *Kúh Mumiáy*, or mummy mountain at Darab, in the territory of Darabgerd in Persia. It is found in a narrow cave

[1] Relation de l'Egypte, 4to. Paris, 1810, p. 201.
[2] Kaempfer Amœnitates Exoticæ, 4to. Lemgoviæ, 1712, p. 520.
[3] Chardin, Voyages en Perse. Tom. iii. p. 212.

at the foot of Mount Caucasus,[1] which is kept shut, and is guarded by persons appointed for that purpose by the king of Persia.

We are told by Ousely, on the authority of the *Seir al beldam*, a book of the tenth century, that this precious substance was annually gathered for the king.[2] When the moúménèhy was collected, it was carefully sealed up in presence of the priests and magistrates, and conveyed by them to the royal repositories. This the *Seir al belad* says is the only genuine mummy; that, in the hands of others being a counterfeited mixture.[3] The revolutions and wars which for so long a time convulsed Persia, seem to have withdrawn the attention of the ruling powers from the precious product of the Caucasian cave; but since the beginning of the seventeenth century, it has as formerly been collected with much pomp and ceremony. The quantity annually procured is rather more than five misqâls.[4]

The Persian physicians of the present day, consider the mumia, which exudes from the *Kúh Mumiáy*, as of infinitely greater value than gold.

[1] A substance very similar is found issuing from the crevices of rocks in the island of Sumatra, and other places in the East Indies. The Abbe Fortis gives a very interesting and curious account of a mine of it in the island of Bua. It is there much celebrated in the treatment of paralytic affections.

[2] Volume ii. p. 113.

[3] Ouseley, vol. ii. p. 114.

[4] Chardin, Voyages en Perse. Tom. iii. p. 309.

In 1809, Mirza Abul Hassan brought to our late Queen Charlotte, as a valuable present from the King of Persia, a portion of this substance.[1]

Sir William Ousely mentions that a person at Ispahan demanded from one of his party nine *tomans*, or L.8 Sterling, for as much as a common sized walnut shell might have contained.[2] The Empress of Russia received, as a royal present, about an ounce in a gold box;[3] and the Persian ambassador presented Louis XIV. with two golden boxes filled with this substance. Bomare gives us the following account of the presentation speech:—"L'ambassadeur de Perse dit à Louis XIV. que le baume momié etoit un specifique pour les fractures des os, et generalement pour toutes les blessures; qu'il etoit employé, pour les maladies et ulceres tant internes qu'externes; en un mot qu'il avoit la proprieté de faire sortir le fer qui pourroit étre resté dans les blessures."[4] And Father Angelo says, "La momia che stilla dà un monte vicino à Lar e cosa preciosa; basta una mesa dramma per sanar in 24 hore un huome caduto dá alto et tutto rotto."[5]

Kaempfer speaks extravagantly in praise of it as a remedy in fractures, and relates an experiment in

[1] Ouseley's Travels, vol. ii. pp. 121 and 478.

[2] Ouseley's Travels, vol. ii. pp. 121, 478.

[3] M. de Ferrieres Sauvebœf Mem. Hist. &c. de Voyages, Tom. ii. ict. d' Hist. Naturelle, Tom. viii. p. 542. Lyons, 1791.—8vo. roph. Persica.

which he broke the leg of a chicken and applied mummy. From the result he was satisfied of its having this property.[1]

Barbadoes tar, and all the petrolea, are applied to the same purposes as those substances already mentioned; and in various parts of Great Britain, there are found mineral tars, which are used medicinally by the common people, and sometimes also by regular practitioners. Lewis, after speaking of the virtues of petroleum in nervous diseases, as a diuretic, an external stimulant in rheumatism, palsy, and chillblains, says, "In these intentions, some mineral oils, procurable among ourselves, are used by the common people, and often with benefit; the empyrical medicine, called British oil, is of the same nature with the petrolea, the genuine sort being extracted by distillation from a hard bitumen, or a kind of stone-coal found in Shropshire,[2] and other parts of England."[3] At St. Catherine's, near Edinburgh, there is a well which is called the *oily well*, from the circumstance of a quantity of petroleum being found on the surface of its water. This the country people use with success in itch, and other external diseases. I am not aware that they administer it internally.

[1] Amœnitates Exoticæ. Lemgoviæ, 1712. 4to, p. 523.

[2] Philosophical Transactions of London. Vide Ap. No. 1.

[3] Lewis' Experimental History of the Materia Medica. Lond. 1791. vol. ii. p. 213.

In the Pharmacopée de Lyons, *naphtha* is recommended in caries of the teeth,[1] and Salmon, a noted empiric, who wrote about the end of the 17th century, says, "that outwardly applied, it *helps the toothache.*"[2]

Preparations of *wood-tar* have been known in medicine from the earliest ages. These substances have both in ancient and modern times, been applied to the very same purposes as creosote. Pliny mentions a variety of tarry substances as being used in medicine, such as *cedria, pissinun*, &c. &c. He recommends cedria or the oil of tar, got from the cedar, in toothache. His words are, "Cedrus magna—dat picem, quae cedria vocatur, *dentium doloribus utilissimam.*"[3] Galen says, when speaking of cedria, "Sicut sibi dentium foraminibus instillatur, siquidem *dolores eorum mitigat.*"[4] We find this substance much talked of in books of comparatively recent date, and it is a curious fact that in the Pharmacopée de Lyons, the "*oleum stillaticum ex ligno cedri,*" is said to cure vomiting, one of the most valuable and striking properties of creosote. What were the reputed virtues of cedria

[1] Pharmacopée de Lyons. A Lyons, 1786, p. 118.

[2] Salmon's Complete English Physician, or Druggist's Shop laid open, first published in 1693. *Vide* article *Naphtha.*

[3] Pliny, lib. xxxiv. 11.

[4] Galeni de Simp. Med. Facult. lib. vii. Folio, Venetiis, 1609.

appear from the following passage: " Le défaut d'observation nous empêche de convenir que la résine de cèdre calme le vomissement, par de matières pitouiteuses, qu'elle excite le cours des urines, provoque le flux menstruel, chasse le graviers contenue dans les voies urinaires, dissipe les obstructions du foie, et de la rate, qu'extérieurement elle contribue à la résolution des tumeurs insensibles, deterge et cicatrise les ulcéres."[1] Speaking of this substance, Pliny says, " Defuncta corpora incorrupta ævis servat, viventia corrumpit : mira differentia cum vitam auferat spirantibus defunctisque pro vita sit."[2] And in another place, "cui tanta vis est ut in Egypto corpora hominum defunctorum eo perfusa serventur."[3] He describes *pissinum* in the following manner : " E pice fit quod pissinum appellant, cum coquitur velleribus supra halitum ejus expansis atque expressis; probatum maxime e Brucia, est enim pinguissima et resinosissima."[4] In another place, speaking of the medicinal properties of pissinum, he says, "usus ad tussim, et quadrupedum scabiem est."[5]

Rayer recommends in various skin diseases, an ointment of one part of tar to four of hog's lard.[6] Bateman, when speaking of ichthyosis, says that

[1] Pharmacopée de Lyons, p. 427.
[2] Lib. xxiv. 11.
[3] Lib. xvi. 21.
[4] Lib. xv. 7.
[5] Lib. xxiii. 50.
[6] On Skin Diseases, (1834) Article Cancer.

pills made of pitch, afford one of the most effectual means of controlling the languid circulation, and the inert and arid condition of the skin;[1] and I am informed that in the hospital at Hamburgh, pitch pills are at present in great repute for the cure of skin diseases. *Tar water* has been found useful in such affections, in dyspepsia and other diseases, but its fame, though at one time great, was short lived, on account of the absurdly extravagant praises of the celebrated Berkeley. In a pamphlet published at St. Petersburgh in 1817, by Sir Alexander Crighton, some very interesting cases are recorded of the beneficial effects of the vapour of tar in pulmonary phthisis. Like creosote, however, and the kindred remedies, it seems only to act as a palliative.

The existence of creosote in *crude pyroligneous acid* has already been stated. M. Schweigger Seidel, and Dr. J. Davy, declare that from their chemical examinations and experiments on animals, creosote is the base of the *Acqua Binelli;*[2] and from the way in which *Empyreumatic water* is obtained, there can be no doubt but that the same remark holds true regarding it. It is procured by adding chalk at a high temperature, to crude pyroligneous acid, till the effervescence ceases, and then drawing off by distillation, a little more than half the liquor. These

[1] Bateman's Synopsis of Skin Diseases, p. 83.
[2] It is sold for 2s. 8d. an ounce in Italy.

substances are well known to be excellent applications in skin diseases.

Soot is another substance which demands our attention. It was at one time much used in this country, and various preparations of it were officinal in our Pharmacopœias, of which the following may serve as examples.

" *Soot drops. Fit. drops. Tinctura fuliginis.*
Wood soot ℥ij.
Kali ppm. lbss.
Sal. ammon. ℥i.
Aq. Fluvialis, lbiij.
Digest for three days, and strain.
Antispasmodic."[1]

Soot drops. Tinctura fuliginis.
Wood soot ℥ij.
Ass. fæt. ℥i.
Proof spirit, lbij.
Antispasmodic ʒss. to ʒjss. in hysteria.

The *Oleum fuliginis*, which was a carefully rectified oil of wood-soot was officinal in the London Pharmacopœia.

Salmon the empiric, already referred to, placed great reliance on various preparations of soot, in gout, palsy, and a variety of nervous diseases ; and

[1] Gray's Supplement to the Pharmacopœia, Lond. 1828, p. 324.
[2] Ibid. p. 358. *Vide* also the older London Pharmacopœias.

a compound tincture with rust of iron, he says, is "prevalent against the green-sickness in virgins, and all such like distempers attending them." The species of soot which he recommends is "that of the smoak of wood, or wood soot, and of that kind, that which is thick, black, shining, and emplastic like pitch." "This," he says, "consists of an ethereal spirit, a peircing yellow oil, and a pure volatil salt."[1]

Recently, in France, M. Blaud, has used preparations of soot with great success in the treatment of ulcers, and a variety of squamous and furfuraceous skin diseases. He has published two memoirs upon the subject, in the *Revue Médicale Française et Etrangere*, in which he gives various formulae for preparing lotions and ointment with this substance, of which the following may serve as specimens.

Lotion for ulcers, &c.

Olive oil, ℥xij.

Soot ℥jv.

To be boiled for twenty-four hours with a gentle fire and then strained.

Ointment for skin diseases, &c.

Soot ℥ij.

Axonge ℥i.

To be boiled for six hours over a gentle fire, then

[1] Salmon's Complete English Physician, p. 105.

cooled, stirring thoroughly with the spatula, after which it is ready for use.

M. Blaud states, that he has found from experience, that when the ingredients are boiled together, a much more efficacious remedy is obtained than when the mixture is made simply by combining the substances in the cold, which is to be accounted for by an additional quantity of creosote being generated by the action of the fire. When M. Blaud first published upon this subject he believed that he was the first physician who had used soot, but he afterwards discovered that it had a place both in the French and British Pharmacopœiæ.[1]

I have not found any allusion, in works of the materia medica, to the use of any preparations of *peat* in medicine, but I have been informed upon good authority, that the oil obtained by the destructive distillation of peat, after repeated rectifications, was used some years ago by a druggist in this city, in the preparation of an empirical carminative, and the same individual was in the habit of prescribing frictions and unctions with this substance in scabies and other skin diseases. And Dr. Rennie, in his Essays on Peat Moss, after stating that no living animal is ever found in it, says, that " to prevent mistake, it may be proper to observe, that it is not insinuated that moss water is in general an unwhole-

[1] Revue Méd. Française et Etrangère, June 1834, and Jan. 1835.

some beverage either to man or beast, on the contrary, it is generally safe, and sometimes salubrious. In certain diseases it is supposed by some to be medicinal."[1]

The same individual who employed peat oil in skin diseases, and as a carminative, was also in the habit of distilling an oil from rags, which he used in toothache, and I believe that *rag oil* has been long a secret remedy in toothache. The idea may have been suggested to those who make use of it by the well known oily substance procured by burning a cone of paper, being a very popular and a very successful application in toothache by the peasantry in various districts of Scotland, and which is called by them *paper oil.* When we reflect upon the composition of paper, it is easy to see that this paper oil must be very strongly charged with creosote.

The *animal oil,* so much extolled by Dippel and Hoffman, and the fame of which was so great on the continent, especially in Italy, is believed by Reichenbach to owe its virtues to creosote.

It is hoped that the details into which we have entered regarding the medicinal properties of those substances which contain creosote, and whose virtues have been long since discovered, will not be deemed mere matters of idle curiosity, and the time

[1] Rennie's Essays on Peat Moss. Edin. 1810. p. 563.

employed in collecting the materials considered as mispent, but that they will be regarded as furnishing a powerful argument in favour of the opinion that creosote is indeed a valuable medicine, and that its name ought no longer to be considered as a mere catchword, by which noisy empirics gull the public.[1]

It must not be thought that in any thing which has been said there is any wish to detract from the importance to medical men of the discovery of creosote. Far from it. None would venture to say that there has been no practical benefit reaped from the discovery of iodine, because burnt sponge and various mineral waters containing that body, were known long before to be useful in discussing tumours, and curing bronchocele. In this respect, Courtois and Reichenbach are on a footing, for both of them have only presented to the medical world old friends unmasked.

[1] However much the praises of the ignorant may have prevented scientific men in this country from justly appreciating creosote, they have created a great demand for it, and thus made it a most lucrative article both to the manufacturer and the druggist. The extensive sale of a drug is, however, no argument in favour of its real value; for were any one to ascribe to creosote the wonderful properties which Morrison says resides in his pills, of curing "*blushing, hurries, and of causing young ladies to enter a room gracefully, and of making every body happy,*" and freeing them of all diseases that flesh is heir to, there would be few houses which would not smell of it.

CHAPTER II.

PHYSIOLOGICAL EFFECTS OF CREOSOTE.

BEFORE we can rightly appreciate, or skilfully apply any therapeutic agent, it is absolutely necessary that we should be acquainted with the effects which it produces upon the animal economy, both in a state of health and disease; and it was under this impression that I made the following experiments upon the lower animals.

First Experiment.

The right jugular vein of an ordinary-sized terrier bitch, was opened about the middle of the neck. It was intended that a drachm of pure creosote should have been introduced into the vein, and with this view the pipette was charged with that quantity; but before two scruples had passed from the instrument, the respiration suddenly became hurried and sonorous, and the gentleman who was listening to the heart's action through the stethoscope, exclaimed, "*the heart has stopped,*" and of course the farther introduction of the substance was discontinued. For some seconds after

this, the animal continued to breathe hurriedly, and before expiring uttered a faint shrill cry.

Whenever respiration had ceased, the thorax was laid open. In performing this operation, it was observed that the muscles of voluntary motion contracted energetically when cut into. On exposing the heart, it was found to be perfectly quiescent; and its contractions could not be excited, either by pricking it with the scalpel, or making incisions into its substance. On the other hand, the œsophagus remained contractile for a considerable time; and on exposing the intestines, the vermicular motion was observed to be going on with great activity. The heart contained a considerable quantity of dark coloured blood in all its cavities, but more in the right than in the left side. Its muscular fibre appeared flaccid. All the large veins leading to the heart were filled with partially coagulated blood, and those of the abdomen were also considerably distended. The lungs were dark coloured from the quantity of blood which they contained, and in the bronchial tubes there was a considerable quantity of a reddish-brown frothy serous looking fluid.

Second Experiment.

The femoral vein of a strong young terrier having been opened high in the thigh, twenty-five

drops of pure creosote were injected. No sooner had this been done, than the sounds of the heart became inaudible, the respiration extremely embarrassed, and after giving a faint cry, the dog expired in violent convulsions in less than half a minute after the introduction of the creosote. About a minute after the sounds of the heart had ceased to be audible through the stethoscope, but before respiration had entirely ceased, a momentary and faint fluttering was felt in the region of the heart.

Immediately after death the cavity of the chest was opened. The heart was observed to be quite quiescent, and its contractions could not be excited by making incisions into its texture, but when some of the blood with which it was gorged had been allowed to escape, it began to contract, and continued to do so for five minutes. The left ventricle contained arterial blood. There was observed in this instance but a slight trace of the frothy fluid seen in the former case. In other respects the appearances were quite similar.

Third Experiment.

enty-five drops of pure creosote were injected
in of an ordinary sized bull-ter-
cts produced were essentially

similar to those described in the two preceding experiments.

Death ensued in this case some seconds sooner than when the poison was introduced into the femoral vein; and it is worthy of remark, that although the heart was perfectly quiescent when the thorax was opened, and did not contract when cuts were made into its substance, yet when by means of an incision into one of its cavities, some of the blood with which it was gorged had been allowed to escape, three distinct contractions were observed.

From what has been detailed, and from what I observed take place in the cases of several other dogs which I destroyed, both by introducing the substance into the stomach and the veins, the symptoms of poisoning with this substance in such cases may be thus described.

Its first deleterious action is the production of a powerfully sedative effect upon the heart, and from the rapidity with which this is manifested, it may be said (without using the expression at all in a figurative manner), almost instantaneously to paralyze the vital energies of that organ. In some instances, hurried and sonorous respiration goes on for more than a minute after the heart ceases to

beat. In general, one or two convulsive fits, approaching tetanic spasm, precede death, and almost invariably before expiring the animals utter one or more shrill cries.

In every instance the atony of the heart, immediately after death, was very striking. The voluntary muscles, œsophagus, and diaphragm, were uniformly found to contract when cut into, and in every instance the vermicular motion of the intestines was apparent. The only other phenomena observed in the examinations after death, were more or less engorgement of the lungs, and in most instances the presence of a greater or less quantity of a reddish brown frothy fluid in the air passages and substance of the lungs. Neither of these appearances can be considered as at all peculiar, or what might not be expected in any case of sudden and violent death. The presence of the frothy fluid cannot be looked upon as in any way characteristic, as it is observed in various instances both of sudden and gradual death, and in the cases under consideration, was not sufficient to warrant us to suppose that it was any specific effect of the creosote, but might arise from other circumstances attending the experiment.

From the following experiments, it appears that when creosote is thrown into arteries, the delete-

rious effects produced are of a much milder nature, and that if the dose is not pretty large, the animal will experience but little inconvenience.

Fourth Experiment.

Twelve drops of undiluted creosote were injected into the carotid artery of a terrier dog. No sooner had the substance passed into the vessel, than the animal gave a faint cry, but did not manifest any other symptoms of inconvenience for about a minute, when it became evidently affected. The breathing for a few seconds was loud and laboured, but this entirely disappeared. The heart's action did not seem to be at all impeded. For about twenty minutes the animal seemed affected with vertigo and stupor, but after that time this ceased to be the case, and in an hour and a half afterwards, when he was killed for another purpose, he was certainly not under the influence of the poison.

Fifth Experiment.

January 12th, 12 noon. About fifty drops of pure creosote were injected into the carotid artery of a rather large-sized sheep-dog. Before making the incision in the artery, it was tied below the place where it was intended to be opened, and as

soon as the fluid had been thrown in, it was secured by means of a ligature. No sooner was the operation over than the animal sprung on his feet, and made an almost successful attempt at escape from the room, the door of which was open. He was carefully observed for about an hour, but during all this time he exhibited not the slightest sign of any functional derangement. The edges of the wound were now brought together by means of stitches, and the animal allowed to remain at rest. He was repeatedly observed during the course of the day, and appeared uniformly quite lively. About 9, P. M. he was for the first time offered food, which he ate with great avidity. He had slight attacks of vomiting for two or three days, but this affection did not continue longer, and at the end of the fifth day, when he was killed, he was in good health. On dissection the artery was found to be firmly plugged up with a coagulum of blood above and below the ligature, but with this exception, there was nothing apparent which could be ascribed to the experiment.

Sixth Experiment.

A drachm and a half of pure creosote was thrown into the carotid of a dog very similar in size and weight to the other two upon whom a similar ex-

periment was performed. For about half an hour nothing was observed which could be traced to the injection of the creosote, although he certainly was slightly convulsed at intervals, but this was probably the effect of fear, as he had been similarly affected from the time he was secured for the operation, and even previously owing to the manner in which he was confined. However, after this time, he became decidedly under the influence of the poison, and sunk gradually into a state approaching coma, spasmodic twitchings of the whole body being pretty strong. For an hour he continued in this state, when he began to revive. He was then killed.

There seems then to be a very marked difference in the effects produced, by introducing creosote into the arteries and veins. Not only are the bad consequences of injecting it into the arteries less apparent, but the last experiment would tend to show that this substance acts also as in the case of prussic acid, by producing coma, as well as by stopping the heart. That this opinion is well founded, appears more clearly from the experiments which next fall under consideration.

Seventh Experiment.

21st December, 1 P. M. Thirty drops of undiluted creosote were introduced into the back part of the mouth of a small young terrier dog, all of which was apparently swallowed. He immediately exhibited signs of uneasiness, and rubbed his head violently on the ground. In three minutes a quantity of saliva, white and considerably frothed, began to issue from the mouth, and continued to flow for some time. In two minutes more, he fell down. In ten minutes after the poison was administered, the breathing became much laboured, slight spasmodic twitchings affected the whole body, especially the ears and extremities, and the heart's action appeared to be feeble and fluttering; but for some time no very accurate stethoscopic observations could be made on account of the convulsed state of the animal. In a quarter of an hour more, and in twenty-five minutes after the poison had been administered, the movements of the heart could not be felt, nor could its sounds be heard; but on applying the ear to the chest, a loud bronchial *souffle* was detected, which continued to increase for some time, and then a rattling noise was heard in the throat. This lasted for a considerable time. Though the scalpel was pushed into the tongue, (which was

hanging out, stiff, and cold,) legs, and other parts of the body, he gave no expression of pain. From a wound which had penetrated one of the brachial veins, a considerable quantity of blood issued, and from this time the dog showed evident signs of returning consciousness; the pupils became dilatable, which, for a long time previously, had not been the case; the eyes gradually regained their lustre, and in ten minutes after the blood had begun to flow, he was observed to move his head slightly upwards. From this time the convulsions which had almost ceased began to return, and rapidly became more frequent. Twenty minutes after the first signs of returning life had been observed, and in exactly an hour and two minutes from the time the creosote was swallowed, he made an unsuccessful attempt to rise, and in a few minutes afterwards he crawled several feet. After this exertion the breathing became again greatly laboured, and he lay for some time quite motionless. In an hour and twenty minutes from the time of the commencement of the recovery, he was able to walk about the room, but was greatly disinclined to move.

At 5 P. M. he refused to eat, and continued to exhibit the same disinclination to move. The breathing was almost natural.

On the 22d,—the following day,—he ate hardly any thing; seemed very sick and dull, and could

not be induced to leave the fire. During this day he had some vomiting.

On the 23d, he ate and drank several times, but uniformly vomited afterwards,—apparently all that he had taken.

On the 24th, the vomiting continued pretty much the same as on the preceding day, but he was decidedly more lively.

On the 25th and 26th he vomited very little, and took a fair allowance of food. In a few days more the bad symptoms had wholly disappeared, and he has ever since enjoyed the most perfect health.

Eighth Experiment.

Twenty-five drops were administered to a strong large-sized bull-terrier dog, but the whole of this quantity was not swallowed. In two minutes saliva was seen issuing copiously from his mouth. In eight minutes more, he was affected with vertigo, and slight tetanic spasms, and his eyes became fixed and dim. For about a quarter of an hour after this he was sleepy-looking and exhibited great disinclination to move, and at intervals he was seized with convulsions. After this, however, he began to revive; and in an hour from the time the poison had been given he seemed to be little, if at all, under its influence.

At 5 P. M. he ate heartily, but vomited during the night.

On the following day he took little food, and what he did take he generally vomited immediately.

On the 23d and 24th the symptoms were very similar, though decidely modified; and on the 25th the effects of the creosote could not be said to be at all apparent.

From the last two experiments, then, it appears that when creosote does not prove instantly fatal, it may produce very striking deleterious effects, but that if the animal survive these for a certain time, they wholly disappear. To the cases related, I may add those of six other dogs, to whom doses of about thirty drops were administered. In these instances the effects were in every essential point identical with those detailed in the seventh and eighth experiments. I was unfortunately obliged to destroy all these six dogs a few hours after the drug had been administered, and was thus deprived of an opportunity of making any observations upon the more remote effects of the poison.

In these last mentioned experiments, then, it appears, that the symptoms produced were dimness and fixation of the eyes, vertigo, and coma, clearly

showing that it was sensation, and not the heart which was chiefly affected.

The following experiment may be considered as proving that when the dose is sufficiently large, the heart may be affected, even although the substance has been introduced into the stomach.

Ninth Experiment.

Thirty drops of pure creosote were introduced by means of an elastic gum tube into the stomach of a small rabbit. Almost instantaneously the animal was strongly affected, the eyes appearing very prominent, and after uttering three or four piercing cries, expired in a convulsed state a minute after the drug was administered.

The chest was instantly laid open. It was observed that the heart was still contracting, but that its movements were very tremulous and feeble. The right side was greatly congested, and became every instant more so. In three minutes and a half after the creosote was given, the heart had ceased to beat, and was quite insensible to stimuli. The peristaltic motion of the intestines, was extremely energetic, and the stomach was very sensible to

irritation. This continued to be the case for a considerable time.

From all these experiments, the poisonous effects of creosote appear to bear a very striking resemblance to those of prussic acid. Like the latter, creosote acts toxicologically, either by stopping the heart, or by directly affecting the brain alone—just as the dose may be larger or smaller, or according to the manner in which the substances are introduced into the system. Another very striking point of resemblance between prussic acid and creosote is the remarkable and almost specific power which they both possess of arresting vomiting, especially if it be unconnected with organic disease.

It is a curious fact that in large doses creosote seems to excite vomiting; and that when given in such quantities, with a view to check it, no good, but evil, results from giving a large dose. Dr. Elliotson has stated this opinion,[1] and Dr. Shortt informed me that his experience confirmed it. Large doses of prussic acid, also, seem to produce vomiting, when the poison does not prove fatal too rapidly for this observation to be made.[2]

[1] "More than two drops I have sometimes seen aggravate the sickness." Medico-Chirurgical Transactions of London. Vol. xix. p. 227.

[2] Dublin Medical and Surgical Journal. Effects of an excessive dose of hydrocyanic acid. Nov. 1835.

The vomiting, however, which ensued in the experiments here recorded, must probably be ascribed to the development of inflammatory action. That such inflammation is excited, is known to be the case by dissection. Corneliani has stated this fact, and Miguet found traces of inflammation in the whole extent of the mucous lining of the digestive canal in one of the dogs which he poisoned with creosote, but which survived the dose some time.[1]

In a dog which I dissected, about thirty hours after a large but not fatal dose of creosote had been administered, distinct traces of inflammation were observed.

The remarkable similarity between the poisonous effects of prussic acid and creosote, will be seen by comparing the details already gone into regarding the latter with the following remarks of Dr. Christison on prussic acid.

"The most accurate and extensive experiments," (on poisoning with prussic acid,) "are those of Emmert, published in 1805, those of Coullon in 1819, and those of Krimer in 1827. They found that when an animal is poisoned with a dose, not quite sufficient to cause death, it is seized in one or two minutes with giddiness, weak-

[1] Miguet sur la Créosote, p. 26.

ness, and salivation, then with tetanic convulsions, and at last with gradually increasing insensibility; that after lying in this state for some time, the insensibility goes off rapidly, and is succeeded by a few attacks of convulsions, and transient giddiness; and that the whole duration of such cases of poisoning, sometimes does not exceed half an hour, but may extend to a whole day or more. When the dose is somewhat larger, the animal perishes either in tetanic convulsions, or comatose." And again, "the pure acid according to Magendie, exhausts the irritability of the heart and voluntary muscles, so completely, that they are insensible even to the stimulus of galvanism. The diluted acid has not always this effect. In the experiments of Coullon, the heart and intestines contracted, and the voluntary muscles continued contractile after death, as usual. But Schubarth states that the heart is never contractile, although the intestines and voluntary muscles retain their contractility. The reason of these discrepant statements is, that a considerable difference really prevails in experiments conducted under circumstances apparently the same.[1] In

[1] A proper investigation of the physiological effects of prussic acid is yet a desideratum; for until the discrepant statements of experimenters are reconciled, we must not rest satisfied. I was present at an experiment along with Dr. J. Reid, and Dr. James Y. Simson, when *an ounce* of Scheele's acid was administered to

eight experiments on cats and rabbits, with the pure acid, the heart contracted spontaneously, as well as under stimuli, for some time after death, except in the instance of the rabbit, killed with twenty-five grains, and one of the cats, killed by three drops applied to the tongue. In the last two, the pulsations of the heart ceased with the short fit of tetanus which preceded death; and in the rabbit, whose chest was laid open instantly after death, the heart was gorged, and its irritability utterly extinct."[1]

In animals poisoned with prussic acid, the lungs are generally found of a dark colour, and gorged with blood, appearances which were also observed in the experiments at present under consideration. In the dogs poisoned with creosote, the voluntary muscles never refused to contract, when cut into immediately after death; nor in any one case was the vermicular motion of the intestines absent. These phenomena, however, did not always manifest themselves in an equally marked manner; and I observed, that in those cases where death was produced most rapidly, the contractility of the muscles,

a dog. Death did not ensue for about a minute; and other dogs of the same size were killed on that occasion as rapidly, by six drops of acid from the very same bottle! And it is particularly worthy of remark, that the contractility of the heart was in none of the cases much, if at all, impaired.

[1] Christison on Poisons, edit. 1835. p. 696.

and the vermicular motion of the intestines were strongest, indicating that the paralysing power of the creosote had not had sufficient time to extend its influence beyond the heart. The correctness of this theory, however, is rendered problematical by the curious circumstance recorded by Magendie, regarding those animals in which the prussic acid took effect with such tremendous rapidity, that he decribes them as dropping down as if struck by a cannon ball. In these cases, he tells us that the irritability of the heart, voluntary muscles, and intestines, was *wholly exhausted.*

The manner of treating a case of poisoning with creosote ought evidently to be similar to that adopted for the counteraction of the effects of prussic acid, namely, the exhibition of ammonia, chlorine, and other stimuli. Probably chlorine may be an antidote to creosote, as when these two substances combine, a compound is formed which contains no creosote; but it yet remains to be determined by experiment what the physiological properties of this substance are, or whether it exerts any influence at all upon the animal economy. Other antidotes might be suggested, but, as their value can only be determined by actual experiment, they may with propriety be passed over. If an animal to whom a poisonous dose of creosote has been given survive a certain time, recovery generally takes place; and this is

another point of resemblance between the effects of prussic acid and creosote. The transient nature of the immediate deleterious effects of creosote suggests the propriety of resorting to artificial respiration.

The circumstance of the heart's contractions being excited by disengorging it of blood, when cutting into its texture produced no effect, has been already stated. It is important as indicating that bleeding, provided absorption be not increased, is the first thing which should be had recourse to in cases of poisoning by creosote, and certain other powerful sedatives, as it appears that in this way the dormant energies of the heart may be roused, and its contractions, so excited, may be afterwards sustained by stimulating treatment. Being struck with the advantages which might result from such a mode of procedure, I performed the following experiment, which amply confirms the notion just stated.

Tenth Experiment.

Thirty drops of creosote were injected into the jugular vein of a large mastiff dog. The heart immediately ceased to beat, and the animal died in a terribly convulsed state. No sooner had the heart ceased to beat, than a large opening was made in the jugular vein and a quantity of blood allowed to

flow. Soon after, a small quantity had been lost, the heart's action could be distinctly felt through the parietes of the chest. It was then exposed, and its contractions were observed to go on for several minutes.

In the account of the fourth experiment, it is stated, that from the time one of the brachial veins was wounded the animal revived. The quantity of blood lost in this instance was comparatively small, and perhaps the stimulus of the wounds contributed as much to the recovery as the loss of blood, especially as the intervention of valves must have prevented any direct good result from unloading the right side of the heart, as takes place when the jugular is opened.

Besides the immediate curative measures which ought to be resorted to, means must be taken to subdue the inflammatory action which a large quantity of creosote never fails to excite in the alimentary organs.

A case could hardly occur, in which the medical jurist would find any difficulty in deciding upon the cause of death, if called to examine the body of an individual poisoned with creosote, as the strong odour of the drug, which continues for weeks to be exhaled by every tissue, along with the appearances presented on dissection, would be considered as proof sufficient. It is stated by Miguet, that in a

dog which he killed with creosote, all the tissues excepting the liver smelled strongly of the substance. I never could satisfy myself of the correctness of this assertion, for no sooner was the body opened than the peculiar odour of creosote pervaded the air so completely that no one present would venture to say whether or not the liver was exempt from the prevailing smell.

The two experiments upon dogs, with creosote, detailed by M. Miguet, seem to confirm those which have been here described, but they are not recorded with sufficient minuteness to render them of much value.

He does not state his opinion as to the mode in which creosote destroys animal life, but puts, in the form of query to the reader, the three following hypotheses. That it proves fatal from producing inflammation,—coagulation of the blood,—or by some peculiar special action on the nervous system.[1]

The notion that creosote proves fatal by coagulating the blood is obviously incorrect, for in no case did I observe any appearance in the blood, immediately after death, similar to that produced by bringing creosote in contact with it, viz. the appearance of numerous white specks caused by the coagulation of the albumen, and, of course, whatever in-

[1] Miguet sur la Créosote, p. 28.

fluence inflammatory action might have in the cases related by Miguet, when the animals survived some hours, in those instances in which the dogs were almost instantaneously killed by injecting creosote into the veins, no such cause can be admitted.

Since the preceding experiments were performed, there has been published, in the first number of the British and Foreign Medical Review, an account of the results of experiments and observations on creosote, of Dr. Guiseppe Corneliani, Professor of Clinical Medicine in the Great Hospital in Pavia. I have not been able to procure any detailed narrative of his experiments, but merely the conclusions to which he came. He says ;—

"1. The internal use of an excessive dose of creosote produces immediate death without organic lesion.

2. The same thing occurs if it be applied to a large nervous branch, or if it be injected into the veins in minute quantities.

3. If the quantity be not sufficient to produce death, it causes a torpor of sensation, and motion, particularly of the lower extremities, the heart, the diaphragm, and the organs of the external senses.

4. As sedatives increase its effects, stimulants would probably relieve them.

5. It produces, when taken internally, an irritation of the gastro-enteric mucous membrane.

6. Oil and mucilage, when combined with it, render it milder, but given with vinegar it acts more forcibly.

7. Few patients can bear more than two drops, four to six times in the space of twenty-four hours.

8. Animals poisoned by it, pass their urine immediately or soon after death.

9. Applied externally it diminishes irritation, and acts as a desiccator.

10. Applied to ulcers and wounds it promotes cicatrization.

11. When inhaled, it causes stupor.

12. It acts as a styptic, provided that the divided vessel be not a large one.

(The experiments were made on lambs, rabbits, dogs, &c.)

Giornale delle Scienze Medico-Chirurgiche, No. 8. *Febbrajo*, 1835. *Pavia.*"[1]

The statement, that oil and mucilage when combined with creosote, render it milder, is probably correct, and is an observation which may be of considerable importance in practice. That vinegar increases its activity, might be easily supposed from its great solubility in that fluid; but of the correctness of the fact as stated by Dr. Corneliani, there seems to be some doubt. In three comparative experi-

[1] British and Foreign Med. Rev. Jan. 1836, p. 265.

ments which I made with a view of ascertaining the justice of his conclusion, there was no apparent difference in the activity of creosote when given with acetic acid, or alone. From the different strength of the animals, and from the small number of the experiments which I performed, they cannot be considered as shewing more, than that the addition of acetic acid produces no very decided increase of activity.

The two following experiments would indicate that the addition of albumen causes creosote to act more forcibly than when given alone, or even with acetic acid. The two dogs upon whom the observations were made, were of an ordinary size, and seemed, from their striking similarity in every respect, to afford proper subjects for a comparative experiment.

Eleventh Experiment.

12th January, 20 minutes before three o'clock two drachms of pure creosote were injected by means of an œsophagus tube into the stomach; and almost immediately afterwards the white of two eggs. In six minutes after the creosote had been given, he became suddenly affected with vertigo, and fell over several times. In another minute his breathing became laboured and sonorous, but this lasted only for two minutes, when the breathing was com-

paratively little affected, and could only be heard upon applying the ear to the chest, when a distinct, though not loud blowing sound was detected. For a short time, however, his breathing was so loud at intervals, as to be heard at a considerable distance. In eight minutes after the creosote was given, he was considerably affected with spasms, and in a minute and a half more fell over, and was never after able to rise. The convulsions soon became very violent, and continued so for twenty-five minutes,—the animal during all this time being in a state of complete coma, from which he never recovered. It was remarked, that the spasms were general over the whole body, but that the posterior extremities and lower jaw were far most violently affected. Although the convulsions were most violent during the twenty-five minutes mentioned, yet they continued pretty strong for an hour more, when they became feeble, and occurred only at intervals. At half-past five the body felt cold, and at first it was supposed that every mark of vitality had ceased to be apparent, but upon a close examination, slight twitchings of the lower jaw and posterior extremities were observed. In a few minutes these also ceased to be perceptible. The cavity of the chest was then laid open, when the heart was found to be much gorged, and there was great venous congestion everywhere. The ventricles were

quiescent, and refused to contract when irritated with the scalpel, but the auricles contracted at intervals spontaneously, and their vermicular motion was very evident.

Twelfth Experiment.

12th January, 3 P. M. Two drachms of creosote, mixed with two drachms of pretty strong acetic acid were injected into the stomach of a dog very similar to that upon which the preceding experiment was performed.

For seventeen minutes he did not exhibit the slightest sign of uneasiness, but in another minute he appeared giddy, and shortly afterwards fell, but rose again immediately. He continued to rise and fall alternately for six minutes, after which time he rapidly became comatose, and lay in this state, and was strongly convulsed. In this case the lower jaw was not for a long time affected, and never was much so; the spasms of the posterior extremities and abdominal muscles were most apparent. About half past four the breathing for the first time became laboured and sonorous. At a quarter past six the spasms being much abated, the chest was laid open. The heart was much gorged. The auricles were observed contracting distinctly, but from a tumultuous spasmodic state into which the body was

thrown upon opening the chest, by which all the viscera were heaved to and fro, it could not be decided whether the ventricles were or were not contracting. The venæ cavæ, pulmonary veins and aorta having been tied, the heart was cut out of the body, and it was then seen that the auricles were contracting at intervals of three or four seconds with considerable force, but that the ventricles were quiescent. All the vessels formerly tied were now suddenly cut through; and in this way the heart was almost instantaneously drained of blood. This caused it to contract with extreme rapidity, and so forcibly, that at each impulse it seemed as if jumping from the plate on which it was placed.

That "animals poisoned with creosote, pass their urine immediately, or soon after death," can hardly be ascribed to the specific action of any poison, for such an occurrence frequently takes place in cases of sudden death from any cause; and I had abundant opportunities of observing that it was by no means a universal occurrence, as Dr. Corneliani states it to be, in cases of poisoning with this substance. Corneliani's ninth and tenth observations seem also to require some modification. He states, "that when externally applied it diminishes irritation." Now this is by no means always the case, for frequently it produces great pain and inflamma-

tion when applied to some ulcers; and I once saw a pretty extensive sore, resembling a burn in appearance, caused by the overflow of saliva, which ensued, upon the application of creosote, to a carious tooth.

In medicine, creosote may be used with great advantage as a sedative or anodyne. To produce such effects it is given in diseases of the heart, pulmonary complaints, vomiting, and to allay the pain of cancer, &c. A patient under Dr. Shortt's care in the Royal Infirmary, afflicted with cancer of the stomach, derived relief from pain in ten minutes after taking a dose of fifteen drops. When its sedative or anodyne action is wished speedily, the object is best attained by inhaling its vapours. When creosote is persevered with, in small and gradually increased doses, it acts as a tonic. In general it does not affect the bowels; but in two cases in which Dr. Shortt pushed its use to a considerable extent, diarrhœa, and in one of the instances, decided dysentery were produced.

The effects of creosote on the urinary organs is remarkably capricious. It sometimes augments the quantity of urine, and in diabetes has been found occasionally to diminish its specific gravity, as well as its quantity. On the other hand, Dr. Elliotson mentions a case in which a minim given three times

a day, caused micturition nine times in an hour. It occasionally produces strangury. In some cases it has been observed to produce very remarkable changes on the colour of the urine, causing it occasionally to assume black and other hues. Like turpentine, and many other substances, it imparts to it its peculiar odour with great rapidity. Creosote is in some instances diaphoretic.

There exists great difference as to the quantity of creosote which patients are able to bear. Dr. Elliotson found that its average dose at first should not exceed one or two drops, which, according to circumstances, might be advantageously increased to six or ten. In some cases unpleasant consequences followed the administration of the fraction of a drop; whereas in the case of one lady he increased the dose to forty drops, and in another case he gave ninety drops in the course of a day, with impunity. In the case of the lady the forty drops occasioned no bad effects; but the addition of a single drop to this quantity, produced the usual unpleasant consequences which follow too large a dose of this substance, viz. vertigo, insensibility, and vomiting.[1]

When creosote is taken into the mouth it occasions violent pain, which extends to the pharynx.

[1] Medico-Chirurgical Transactions, vol. xix. p. 220.

The pain of the tongue is extremely acute, but seldom continues more than a few minutes. The lips retain the feeling of pain much longer. For a considerable time after the pain excited in the mouth has subsided, a strong and disagreeable taste of smoke remains, and some individuals allege that they have continued to feel this for several days after using it for toothache.

Insects and fishes, when immersed in a solution of twelve drops of creosote in two ounces of water, die in about two minutes.

After one or two waterings with creosote water, plants fade and die. M. Miguet watered a young and healthy rose bush which had a number of buds, and a newly expanded flower, for seven days, with a solution of creosote, and did not observe any change in its appearance; but on the eighth day it began to droop, or as he expresses it, "*son aspect était triste.*" He dropped some of the same solution upon the rose, which was of a beautiful bright red colour, when it assumed a pale, and then a yellow appearance; and he observed that the same changes were produced upon the green leaves.[2]

The effects of creosote upon animal and vegetable life, are quite analogous with those of the tarry substances generally, and of peat water.

[1] Miguet, p. 23.

[2] Miguet, p. 24.

In concluding this subject, it is proper to state, that great care was taken when conducting the experiments here detailed, to guard against every source of fallacy; and I trust that this has been pretty nearly attained—a result in a great measure dependent upon the valuable assistance which I received from several friends, but especially from Dr. John Reid, whose dexterity in conducting such operations is well known.

CHAPTER III.

MEDICINAL USES.

Most new remedies enjoy a short-lived reputation, however destitute they may be of the virtues ascribed to them. There are always a number of individuals of a sanguine temperament, who hail the discovery of every new or pretended medicine with delight: whose peculiar mental conformation prevents them from justly appreciating them; and to whom oft repeated disappointments can never teach caution. There are others again who are apt to err on the opposite side, and who are ready to scoff at the mere mention of a new remedy, or who at least, if they do not go quite so far as this, are con-

tented to remain in a state of scepticism, without ever dreaming of investigating the subject. Hence it is, that we frequently find one part of the profession bestowing the most lavish praises upon a new remedy, while others are at the same moment stoutly asserting its utter inefficacy. From the numerous fallacies to which experiments upon the body, both in a state of health and disease are liable, we must have accounts of the results which a number of practitioners have obtained from the use of the remedy in those diseases, in which it is reported to be useful, before we can attempt to draw any general conclusions, for no opinion in medicine can be received with any degree of satisfaction, which is not the result of a philosophical induction from numerous facts ascertained by a variety of individuals.

Creosote, fortunately, has now been tried extensively in hospital and private practice, both on the continent and in this country, so that we have already, upon the whole, a sufficient number of cases before us, to enable us to draw such conclusions as ought to bear a very near approximation to the truth. And we trust, that ere long it will be generally admitted, that although creosote is not the universal remedy which some pretend, it is nevertheless a most valuable addition to the modern Materia Medica.

it certainly never would; but it may be *partially* destroyed, for the pain often returns months after nitric acid has been applied, in which case it is more probable that the remedy acts as a caustic than by coagulating albumen. 2dly, The creosote may unite chemically with the albumen of the fluids which are always exuding from a carious tooth, and thus form a crust to protect the nervous pulp from the irritating action of the air; or 3dly, It may perhaps afford relief by stimulating the loaded vessels of the nerve, and causing them to contract and expel the blood with which they are surcharged. That it in any case arrests the diseased action of the tooth is extremely problematical. I have seen cases in which its application completely cured the pain, but where the caries went on rapidly.

The best method of introducing creosote into the diseased tooth is with a fine camel's hair pencil. When this has been done, the cavity should be filled with cotton saturated with pure creosote, care being taken that there are no adhering drops by means of which the interior of the mouth might be rendered hot and painful, and in some individuals even blistered. It is of great importance previously to clean out thoroughly the cavity. Frémanger, in a paper in the Bulletin Général Thérapeutique insists upon the observance of this rule. He says,

"Pour obtenir un résultat favorable de l'usage de cette substance, il faut que la carie soit parfaitement nettoyée et séchée ; sans cette précaution indispensable l'action du médicament se passe moins sur la partie malade de l'os et sur l'extrémité du fillet nerveux mis à nu, que sur les matières contenues dans la cavité de la dent malade."[1] The most careful attention can hardly prevent a minute portion of the substance from finding its way into the mouth, but this generally produces no other unpleasant effects than a slight burning sensation for some minutes at the tip of the tongue, and a hot feeling in the mouth, and frequently in the lips caused by the copiously secreted saliva which overflows being mixed with a minute quantity of creosote.

Caries.

Reichenbach,[2] has recorded two cases of what he calls caries, in which the disease was cured by the application of lotions of creosote and water, but

[1] Bulletin Général de Thérapeutique, t. viii. May 1835.

[2] Bulletin Général de Thérapeutique, t. viii. May 1835. It seems unnecessary to refer to the journals in which M. Reichenbach's cases appear, farther than to state, that his papers may be found in most of the German, French, and British Medical periodicals of the last four years, and the substance of them in a pamphlet published in Paris in 1835, by M. Miguet.

as he has given so little information regarding these cases, and as his assertion that creosote is useful in this disease, has not been sufficiently confirmed by later experimenters, there does not seem to be sufficient cause for our trusting to it in this malady, which surgeons have hitherto accounted so intractable.

M. Frémanger states, that he believes it arrests the progress of caries, and that it does so by combining with the calcareous salts of the bones, and forming a new combination, which by its solubility tends to disengage the areolar tissue and stop the ulceration at the proper point for the commencement of cicatrization. Before we begin to form theories as to the mode in which remedies act, we ought to be provided with cases upon which to found our hypotheses; but Frémanger does not seem to have been so furnished, for he only mentions one case (excluding those of toothache,) in which he tried this remedy. We shall dismiss the subject by stating the facts. A patient with scrofulous caries of the first and second phalangal bones of the index finger, complicated with a fistulous opening into the joint, who had for ten months been using, without any advantage, preparations of iodine, and mercury, was speedily cured by creosote. It was for the first ten days introduced pure into the fistula by means of cotton, and afterwards an injection of five drops to the ounce of water was thrown in, for

which was afterwards substituted the following ointment,—

Cerate, one ounce;
Oil of sweet almonds, one ounce;
Creosote, thirty minims.[1]

Burns and Scalds.

Reichenbach, among his first experiments with creosote, as a therapeutic agent, applied it to slight scalds, in which he found it of eminent service. Suppuration was arrested, and the sores healed rapidly.[2] In the treatment of burns, it has been used in France by Berthelot and Coupil.[3] They state that it has a remarkable tendency to cause the sores to cicatrize from the circumference to the centre, and thus prevent those irregular contractions which in so many instances produce permanent disfigurement. A crust, in the first instance, forms on the injured surface, which spontaneously separates in a few days. In this, as in most cases of the external application of creosote, suppuration is prevented from taking place, or if it has commenced, this diseased action is arrested. It appears then to be an exceedingly valuable application to burns, as it pre-

[1] Bulletin Général de Thérapeutique, 1833, p. 268.
[2] Bulletin Général de Thérapeutique, 1833, p. 208.
[3] Bulletin Général de Thérapeutique, Feb. 1834.

vents the two most usual bad effects of such injuries, viz. extensive suppuration, and contraction of the cicatrices. Berthelot makes use of what he calls *l'eau de créosote*, which is a solution of three or four drops of creosote in an ounce of water.

Recent Wounds.—Power of arresting Hemorrhage.

Creosote possesses in a high degree the power of arresting hemorrhage from the capillaries; but it is only for the purpose of stopping bleeding that it ought to be applied to those wounds which it is desirable should heal by the first intention; and its use should be abandoned as soon as the bleeding is fairly subdued, as by uniting with the lymph effused it forms a substance which prevents adhesion taking place, in the same way that any other foreign body would do.

As to the efficacy of creosote in stopping hemorrhage from large vessels, there seems to be great disparity of opinion. Some assert that it is wholly ineffectual, while others ascribe to it in this respect almost miraculous powers, stating that on this account it must prove invaluable on the field of battle.

Dr. Hœring of Neustadt has made this point the subject of experiment on the lower animals. He

found that the hemorrhage from large arteries and veins was arrested in a few minutes by the application of a dossil of lint soaked in a solution of two drops of pure creosote in a hundred of water.[1] Dr. Bichthauer of Küngelsau relates a case, in which profuse bleeding from a leech-bite in a child was immediately arrested by a similar application, after all other measures had been found ineffectual, and the patient was rapidly sinking.[2]

The styptic powers of creosote have also been experimented upon at Munich. In an experiment performed there, the carotid artery of a dog was cut through, and the bleeding was stopped by applying creosote, and then pressing the vessel with the finger. The blood did not flow, and the wound healed in a few days, without the application of a bandage. The editor of the Edinburgh Medical and Surgical Journal, after relating this experiment, exclaims, "Is this credible?"[3] It certainly appears to savour somewhat too strongly of the marvellous; but from the following circumstance which occurred to myself, I am inclined to believe that the statement is not so highly coloured as some may imagine. When experimenting upon the poisonous effects of creosote, I had occasion to inject a quantity of pure creosote into the carotid artery of a

[1] Gazette Médicale de Paris, Dec. 1834.
[2] Same memoir.
[3] Vol. xliii. p. 243.

dog. The effects produced on the animal passed away in about twenty minutes, and he revived from a state of great stupefaction, and crawled about; but to my astonishment no blood had all this time issued from the wound, not even previous to the developement of the poisonous consequences of the experiment.

Ulcers and Chancres.

In the treatment of ulcers of various kinds, creosote may be employed with advantage; but it is in the scrofulous, aphthous, phagedenic, and venereal kinds, that it has been found most useful. Coupil and Berthelot say, that they have applied it with advantage in the treatment of varicose ulcers; but here it is probably far surpassed by the black wash, which may be almost considered as a specific application in this species of ulcer. Various cases of scrofulous ulceration successfully treated by it are to be found in the recent numbers of the Continental journals; and I had lately an opportunity of seeing a case of this kind treated by Dr. Shortt, in the Royal Infirmary, where an extensive scrofulous ulcer of the hip, after resisting a variety of treatment, at last yielded to creosote, and was ultimately completely cicatrized. In an aphthous state of the mouth, occasioned by mercury, it is said to be peculiarly serviceable; and during last winter

I had an opportunity of seeing a case of this kind, in which the most salutary effects were produced by it.

In Magendie's Formulary of New Medicines, as improved by Gully, a case of aphthous ulceration of the mouth is mentioned, where the following wash was used every two hours:—

Creosote, half a drachm.
Gum arabic, one ounce and a half.
Camphor mixture, ten and a half ounces.
Mix.[1]

After the second washing the slough separated, and the depressions in the mucous membrane, (several of which were as large as half a sixpence), filled up with remarkable rapidity.

Chronic venereal ulcers, after resisting every variety of treatment, heal generally under the external application of creosote. Dr. William Cumming, of the H. E. I. C. S., when in Edinburgh last winter, had various opportunities of trying it in such cases in his extensive practice among the poor, and informed me, that even in cases which appeared unpromising, from the bad habit of the patient, and the great extent of the ulceration, cicatrization was rapidly accomplished through its efficacy. Künchel has used it in syphilitic ulcers of the throat with great success.

[1] Page 205.

He tells us, that two patients, with deep and extensive ulcers on the interior of the mouth, and upon the tonsils, who had been under the influence of mercury, without any good effect, for five or six months, were cured by him with gargles of creosote water in six weeks. These gargles were used five times a-day; and along with their use were continued small doses of the corrosive sublimate of mercury.[1] Thus he found that these sores, though they did not heal under the influence of mercury alone, speedily took on a healing action when the creosote was used along with it.

M. Lessère, who has also used it with much success in such affections, has published the following very interesting case. On the 10th September 1833, a patient came to consult him under the following circumstances: On the uvula, velum palati, and left tonsil, were seated deep ulcers, of a livid colour, with abrupt edges. The neighbouring tissues were in a state of intense inflammation, and he experienced great pain in deglutition. During December the inflammation was subdued by antiphlogistic measures, and the ulcers were touched from time to time with nitrate of silver. The ulceration still continued its ravages, destroying the uvula, velum palati, and affected tonsil. Dilu-

[1] Bulletin Général Thérapeutique, tom. v. page 311.

ent drinks, sarsaparilla, extract of parsley root, and lastly eighty mercurial pills with opium, were given; but they only served to aggravate the pain. During this treatment, the ulcers neither increased, nor shewed any inclination to heal. In the beginning of March, the water of creosote (*l'eau de créosote*) was applied six or eight times to the ulcerated surface by means of a pledget of lint, and in fifteen days the cicatrization was completed. From this case it appears, that when the use of mercury has been abandoned on account of its want of effect, creosote, unaided by it, may accomplish a cure; and as a farther confirmation of this fact, I may state, that some of Dr. Cumming's cases formerly alluded to were of this nature. From a consideration then of the last mentioned facts, in connexion with the cases of M. Künchel, it appears that creosote, either alone or aided by the constitutional effect of mercury, is an invaluable application to this class of sores, which from various circumstances are found in practice so frequently to resist all ordinary treatment.

In the application of creosote to ulcers, there are several facts which the practitioner should bear in mind. It is important to remember, that water only dissolves one-eightieth part of creosote. If a small excess of creosote be present, it will not fall to the bottom, but will float on the surface, in the

form of minute globules; and when the lint to be applied to the surface is dipped in the lotion so formed, these globules adhere, and in this way a very different wash is placed on the sore from what was intended.

It is sometimes proper to apply pure creosote to ulcers, but in most instances the aqueous solution of various strengths will be found to answer better; and in very few cases where the raw surface is extensive ought pure creosote to be used, as too severe irritation is generally the result. There are circumstances, however, in which it appears that large quantities of undiluted creosote have been applied with decided advantage to ulcerated surfaces of considerable extent. An interesting case of this kind is recorded by Künchel.[1] The patient was a man of sixty-five years of age, who had been afflicted for fifteen years with a large ulcer in the ankle, accompanied with lardaceous degeneration, and attended by the most excruciating pain. In these circumstances M. Künchel applied it to the whole extent of the disease with the best possible result, and without the excitement of any undue inflammatory action. When creosote is used pure, it rarely requires to be applied more than once; but if the application be repeated, it should be with caution,

[1] Bulletin Général de Thérapeutique, 1833, p. 313.

and at intervals, lest inflammation be unexpectedly produced. More or less inflammation always follows the application of pure creosote to a raw surface, and it continues, according to circumstances, from a few hours to several days. It is a good rule therefore, not to repeat the application till this has subsided. At the beginning of the treatment, creosote, either pure or in the form of lotion, should be more copiously applied than afterwards; and as soon as a healthy granulating surface appears, it may with advantage be altogether discontinued, and some of the common lotions of the metallic salts substituted; for it is a generally admitted fact, that in treating solutions of continuity, the most signal advantage frequently results from varying the lotion or dressing. Creosote may be applied to ulcers under various forms; and it is for the practitioner to consider which is the most advisable, according to the circumstances of the case he may have to treat. Probably, in general, the best method is to spread the lotion gently over the surface of the sore, by means of a camel's hair pencil. It may also be used in the form of ointment, and if the ulcer is irritable, this may be spread on the surface of a poultice. In addition to the formulary given in page 107, the following, which Dr. Shortt used in a case of phagedenic ulceration, and probably in other instances, is subjoined.

Creozoti, gtt. x.
Aceti, ʒij.
Aquæ Fontis, ℥ij.
Misce et fiat Lotio.[1]

To chancres creosote should be applied with a camel's hair pencil; one or two applications are frequently sufficient, and more may do harm. M. Berthelot relates a case in which a large chancre on the *glans penis*, after resisting treatment with the nitrate of silver, rapidly healed when it was dressed with lint soaked in a solution of creosote in water.[2]

Cancer and Lupus.

This is a disease rarely if ever cured, being one of those opprobria of the surgical profession which has in all ages baffled the skill of the most distinguished practitioners, and for which the knife must be still considered the only remedy. Many substances have from time to time been brought before the profession as specific cures of this disease, each in its day being extravagantly eulogised by its patrons; but there is not at this moment any one article or combination of articles in the materia me-

[1] See MSS. Journals of the Royal Infirmary, 1835, case of John Norris, tinsmith.

[2] Bulletin Général de Thérapeutique, Feb. 1834.

dica to which the surgeon trusts for the accomplishment of a cure of cancer.

Creosote has been proposed as likely to supply this desideratum, and as it is possessed of properties peculiar to itself, the most sanguine expectations have been entertained by some of its efficiency, and the result of the experience of those who have employed it is such as ought to lead to farther trials, but till a number of additional observations have been made, its real value in the treatment of cancer cannot be decided.

Reichenbach, Graefe of Berlin, Cloquet, and others to be noticed, state that they have employed it with great advantage. Graefe, in his surgery, gives a case of very extensive cancer of the face and palate, which was much improved by creosote ;[1] and M. Breschet announced to the Academy of Medicine in Paris, during last year, that he had employed this remedy in a case of cancerous ulceration of the nose, in the Hôtel Dieu, with great benefit.

M. Téalier applied a saturated solution of creosote in water to an open cancer, situated on the breast of a woman, who was suffering most excruciating pain from it; and it was with a view of alleviating this that he employed the creosote.

[1] Dictionnaire de Médecin. Article Cancer.

The result is interesting. No sooner had the solution come in contact with the ulcerated surface, than the patient complained of an acute burning pain in the sore, shooting through the right side of the chest and extending from the head to the very tips of the toes. This continued for an hour, after which the pain entirely ceased, and the patient enjoyed uninterrupted sleep for ten hours. Subsequent applications uniformly allayed the pain, and under its use the sore assumed a more satisfactory appearance. The same gentleman has used it in various affections of the neck of the uterus. In one case he applied a mixture of one part of creosote to three of water to an ulcer in that situation. The pain which was immediately produced was of such a nature as to cause the woman to toss about in bed like one in convulsions. To alleviate her sufferings he ordered injections of cold water, but the pain did not wholly leave her till the second day, when she was quite free of it, which had not been the case for two months before. The creosote was continued, but was afterwards used in a less concentrated form, and the patient was doing well when he reported the case to the *Societé de Medecine* of Paris.[1] These cases are interesting from the remarkable effects immediately produced, but are of little im-

[1] Revue Médicale Française et Etrangère, Fev. 1834.

portance in enabling us to decide upon the value of creosote as a remedy in cancer from their imperfect state. M. Marchal has published a case of cancer of the lip in which he believes he accomplished a permanent cure by means of creosote. The ulcer had all the external appearance of cancer, and was attended with the lancinating pains so characteristic of that malady. Besides applying to its surface lint soaked in pure creosote, he occasionally touched it with caustic; and under this treatment the sore cicatrized and the lancinating pains ceased. M. Marchal suggests the probability of the caustic inducing the ulcer more readily to take on a healing action under the use of the creosote, but ascribes to the latter the chief merit of the cure.[1] He states that the application of the pure creosote occasioned at first very acute pain; and this is the most common occurrence, though it is by no means uniformly to be looked for. In consequence of reading the above case of M. Marchal, I was induced to try the effects of the application of pure creosote in lupus of the nose. The size of the affected part was rather less than half a sixpence, and had been very slowly increasing for about three years. Upon applying pure creosote to this surface the patient experienced *no uneasiness.* For about a week it

[1] Gazette Médicale de Paris, Fev. 1835.

was dressed with lotions of creosote water, and from time to time touched with undiluted creosote. For a day or two no change seemed to take place, but after this the parts surrounding the sore became inflamed, and at the end of the week the ulcer was decidedly larger than previous to the application of the creosote, and in consequence of the obvious injury done by the treatment, it was abandoned.

Professor Wolff of Berlin tried the effects of injections of creosote water into the vagina in two cases of cancer of the uterus. In both instances violent pain ensued, and one of the patients was obliged on this account after nine days, to refrain from employing it, and the other, after persevering in its use for twenty-six days, was compelled from a like cause to desist. In neither case was there any diminution of the secretion or of the metrorrhagia. One of the patients expired after violent metrorrhagia, but the other died more slowly.

During last summer I saw it tried in the clinical wards of the Surgical Hospital by Professor Syme, in a dreadful case of lupus. The fœtor of the discharge, which was before very great, seemed to be corrected, but besides this there was apparently no good effect produced. The case, however, was so very

[1] Medicinische Zeitung vom vereine für Heilkunde in Preussen, 1834. No. 30.

bad, that no application could be expected to benefit it,—the articulation of the lower jaw being exposed on one side, and an immense surface involved in the disease.

Cutaneous Diseases.

Creosote has been found useful in various affections of the skin, both when administered internally, and when used in the form of lotion. Dr. Elliotson has published several important cases illustrating the use of creosote in skin diseases. In a case of acune rosacea he accomplished a cure. The patient had been subject for seven years to the eruption, and was at the same time affected with headache, nervousness, thirst in the morning, and acid eructations. She continued under treatment for a month without any marked improvement, when Dr. Elliotson determined upon trying creosote. The advantage which resulted was very striking, for in three days the eruption was evidently diminished. At first she took only two minims three times a-day, but this quantity was gradually augmented to twenty minims, (a drachm daily,) the farther increase of the dose being prevented by the supervention of giddiness and trembling of the body. She was discharged at the end of seven months from the time she began to take

the creosote, when the eruption was scarcely perceptible, and the dyspeptic symptoms entirely removed. This case is particularly valuable, as Dr. Elliotson put the real efficacy of the remedy to the test. For imagining that part of the benefit resulted from her low diet, he ordered her to be put upon full allowance, when the cure continued to go on progressing in the same gradual but decided manner in which it had previously been doing.[1]

In a chronic pustular disease not remediable by antiphlogistic measures, Dr. Elliotson states, that he never saw such advantage from any medicine before.[2] Dr. Copland has found a saturated solution in water answer well as a lotion in *porrigo favosa*,[3] but most of those who have employed creosote in skin diseases seem to have ordered it in a much more diluted form.

On the continent, creosote has been extensively used as an external application in *scabies, ringworm, impetigo*, &c. by Reichenbach, Berthollet, and others. Professor Wolff of Berlin cured, in eight weeks, a case of impetigo sparsa of twenty-

[1] Lancet, July 4, 1834, vol. ii. p. 459.

[2] Medico-Chirurgical Transactions of London, vol. xix. p. 237.

[3] Magendie's Formulary of New Remedies, with Additions by Dr. J. M. Gully. Lond. 1835, p. 204.

five years standing, with fomentations of creosote water.[1]

It is a very valuable application to *chilblains*, and may be used either in the form of lotion or ointment. Dr. Hahn of Stuttgart says, that whether they be ulcerated or not, he accomplishes a cure in the course of a few days by means of fomentations of water and creosote.[2] I have seen it tried in four cases, and in all it proved decidedly efficacious. A complete cure was effected in every instance by two or three applications of a mixture of equal parts of creosote and almond oil to the part, which was at the same time well rubbed with a smooth cork.

In mammary and infantile excoriations, and chaps from cold, creosote has been used by Reichenbach, Hœring, and Fichtbauer.[3]

Chronic Glanders. Power which Creosote has of counteracting the fœtor of Discharges.

Dr. Elliotson accomplished a cure in the course of a few weeks of two cases of chronic glanders, by the sedulous use of an injection of a diluted so-

[1] Medicinische Zeitung vom vereine für Heilkunde in Preussen, 1834. No. 30.

[2] Gazette Médicale de Paris. Dec. 1834.

[3] Gazette Médicale de Paris. Dec. 1834.

lution of creosote up the affected nostril, combining the treatment in one of the instances with the internal use of the remedy. The strength of the injection employed was one drop of creosote to one ounce of water. In one of the cases he ordered an additional drop of creosote, but as the patient complained of the strength of the injection, it was afterwards applied of the original strength. Both patients contracted the disease from the same horse, and were very similarly affected. Dr. Elliotson describes the symptoms in one of the cases in the following manner :—" A dull aching pain across the brows and in the eye-balls ; his nose felt stuffed, and there was a considerable discharge of a thick, yellow, offensive matter from one of the nostrils. He had also a cough, and expectorated matter of a similar character to that discharged from the nose. His health had not been disturbed till about two days before admission into the hospital, when he lost his appetite, and was seized with a pain in the epigastric region. His feces were of a colour similar to that of the discharge."[1] The offensive nature of the discharge was speedily corrected by the creosote, and when the patient was dismissed it had ceased ; the evacuations were natural ; and he left the hospital quite well. In the other

[1] Lancet. June 20, 1833.

case the medicine was also given internally, but it is not stated that the amendment was more striking, or the cure more complete.

The speed with which the fœtor of the discharge was corrected by means of the creosote points out one very important use of this medicine. Mr. Syme's case of Lupus already related shows the same thing, and in certain cases creosote must prove of great value to the surgeon as an agent for counteracting the effluvia of discharges. All who have tried it seem satisfied that it possesses this property. When the contents of the intestines have been very offensive, Dr. Elliotson has found advantage from impregnating clysters with it; and he and others recommend it in mercurial fœtor.[1]

Diseases of the Eye.

Coster has used creosote in chronic inflammation and suppuration of the eyelids, and Dr. Shortt tried it in the Royal Infirmary here last summer, in a case of purulent ophthalmia. The facts of the case are as follows:—A man was admitted on the 30th of June on account of purulent ophthalmia. Nitrate of silver collyria, scarifying, and other remedial measures were had recourse to, without

[1] Medico-Chirurgical Transactions of Lond. vol. xix. p. 234.

any decided good effect; and on the 14th of July a drop of pure creosote was introduced into the eye. On the 15th we find the following report entered on the Journals. "A drop of creosote was introduced into the left eye yesterday at four o'clock, which at first occasioned considerable pain, but which was almost entirely removed in a short time by hot fomentations. It produced soon after its application considerable vascularity of the conjunctiva and eyelids, with a slight degree of swelling of the upper palpebra. This morning the eye appears less irritable, and the eyelids more open:—the opacity is much as yesterday, but the chemosis is much diminished.

Repeat fomentation to eyes, and the solutions of caustic to the right eye."

There is no farther report as to the creosote, so that probably it was not again applied; and there is certainly nothing in the effects produced by it likely to call for its farther use. Indeed, the consequences were such as ought to prevent those who are aware of the facts just stated from ever introducing pure creosote into the eye.

M. Sanson tried creosote in different kinds of ophthalmia, but never observed the disease at all modified by the treatment.[1]

[1] Compte rendu des Séances de la Société de Médecine.—Séance du 7 Mars 1834.

Gonorrhœa.

Dr. Elliotson having heard that creosote had been used in gonorrhœa with advantage, and believing the account not improbable, from the fact of the turpentines having always had considerable reputation in this affection after the inflammatory stage was past, and knowing that creosote bears a strong analogy to them in many of its properties, he was induced to make a trial of it. He gave at first two drops in an ounce of water, and then increased the dose to four, six, and at last to eight minims.[1] No good resulted from its use. His experiment having, however, been made upon a female, it cannot be considered as settling the question as to the efficacy of creosote as a remedy in claps, for, from the difference of the seat of the disease in males and females, medicines given internally, though they frequently seem to benefit the former, are seldom if ever of the least advantage to females affected with vaginal discharges.

Dr. Hahn tried the effects of injection of creosote water in the advanced stages of gonorrhœa and gleet, but without any benefit. In some of the

[1] Lancet, December 1835, vol. ii. p. 435.

cases it caused a return of the inflammatory symptoms, and in one instance produced swelled testicle.[1]

Menorrhagia.

Dr. Hauff of Besigheim has found injections of creosote water of great use in arresting this species of uterine hæmorrhage. He has only, as far as I am aware, published one case in which he tried it, and others do not seem to have employed it in similar circumstances. Dr. Hauff's patient was a girl of twenty, who had been subject for eighteen months to irregularity in the return of the periods of menstruation, and also in their duration. Ultimately, from the profusion of the discharge, her countenance became pale, though not sickly looking. Her pulse was slow and feeble, and all the secretions and excretions went on languidly. She did not complain of pain in her loins or lower part of the abdomen, and there was no indication of leucorrhæa. The blood evacuated was sometimes in black coagulated masses, and at other times it was fluid and of a brown appearance. Various vegetable and metallic astringents, ipecacuan in nauseating doses, astringent injections, and plugging, had all been severally had recourse to without ef-

[1] Gazette Médicale de Paris, Dec. 1834.

fect. Frequent injections of creosote water were now ordered daily, and pledgets soaked in a similar solution were introduced into the vagina. In a few days the flow of blood became less profuse, and after some weeks was very trivial; and the neck of the uterus, which had formerly been soft and spongy, regained its proper consistence, and the patient's colour and strength returned.[1]

Tumours and Excrescences of various kinds. Bubo—Condyloma, &c.

The external application of creosote has been tried apparently with considerable advantage in discussing various kinds of tumours. Reichenbach employed it in whitlow.

M. Martin Solon applied it with remarkable success to a venereal bubo. Leeches had been repeatedly applied, and poultices of lintseed and rice, and also lotions and frictions with iodine; but it went on to suppuration. He now directed the rice poultices to be moistened with creosote water, and to be renewed twice a-day. On the second day, the swelling was less, on the fourth fluctuation was not perceptible, and in four days more the bubo was entirely discussed.[2]

[1] Gazette Médicale de Paris, Déc. 1834.
[2] Bulletin Général de Thérapeutique, Dec. 1834.

Dr. Heyfelder has removed excrescences from the anus in a fortnight, by means of creosote, after the failure of other remedies. Dr. Hahn says, that condylomatous growths generally disappear under the use of lotions of creosote water, and if they are obstinate he employs pure creosote. They then desiccate and fall off in crusts.[1]

Dr. Ure states that creosote has been tried at Berlin by Fricke and others, in those cases of endermic condylomata where the desired local changes are tardy in manifesting themselves. He says, that it seemed only to be useful when they were small and of recent date, and implanted on a smooth lubricated surface, such as the internal portion of the nymphæ and prepuce. Fricke has tried it on a very extensive scale, and says that it not only removes condylomes, but prevents relapse.[2]

Diabetes.

From the result of the trials of Professor Berndt and Dr. Elliotson, it appears that creosote is sometimes of use in the treatment of this strange dis-

[1] Gazette Médicale de Paris, Dec. 1834.

[2] Dr. Ure's Observations on the Venereal Practice of Berlin. Med. Gazette, Feb. 1836.

ease, and may be even greatly instrumental in the accomplishment of a cure.

The following particulars of the case in which professor Berndt employed this remedy, are to be found in the Lancet of July 18, 1835, being translated from Kleiner's Repertorium for January 1835.

"The patient was a man, fifty years of age, ill for the last sixteen months; he passed daily seven Berlin quarts of urine, sweet to the taste and smell, containing a good deal of sugar, and of a troubled aspect: the patient was feeble, his appetite very great, and he was tormented by constant thirst; his sleep was disturbed by the frequent necessity of making water, but he had no hectic fever. The treatment was commenced by administering a vomitive, which brought away some acid-smelling stuff. Rollo's plan of treatment was then employed for some days, and ipecacuanha was given in small doses; this produced no good effect, and instead of the ipecacuanha, eight drops of creosote were administered in the form of pill every day. The quantity of urine now excreted fell to three, two and a half, and two quarts per day. It appeared at first to contain a good deal of alkalies, particularly ammonia, and remained troubled. The dose of the creosote was gradually increased, and after three weeks Rollo's regimen was abandoned on ac-

count of the disgust it excited in the patient. At this time the urine gave the odour of horse's urine, contained less sugar, and exhibited the first traces of urea, though it continued still turbid. Under the common diet and increased doses of creosote, the urine diminished to two or one quart and a half; it was occasionally clear, gave an acid reaction; the quantity of sugar became daily less, and that of urea greater. After some time the patient's state was evidently improved. He now took twenty-four drops a-day, his appetite was good, and his thirst much less, and the urine flowed at from one and a quarter to one quart and three quarters per day. In a few days more it assumed a natural colour, contained all the ingredients of normal urine, and ceased to give any trace of sugar."

Dr. Elliotson has tried creosote in four cases of diabetes, the particulars of which are subjoined. The first patient was a gentleman about sixty years of age, plethoric, and with a full pulse. He had suffered two attacks of palsy. He had been ill for four or five years, but his complaint was always worst in autumn, and least severe in spring. He made water twelve times a-day, and thrice during the night. He stated that the quantity of urine was not more than four pints. It was found to contain a great deal of sugar. He was ordered creosote on the 13th of August, and on the 10th of

September he was only making water six times in the day, and once during the night, and it contained but a slight trace of sugar. After some time, however, the frequent micturition and thirst returned, but Dr. Elliotson had not an opportunity of examining the urine.

The second case is that of a young gentleman who was making twenty-four pints of urine a-day of specific gravity 1038. It was very frothy, and contained a large quantity of sugar. In this instance the general health was much improved, but the disease was not alleviated.

The third patient was a gentleman about forty, who had laboured under the disease for six months. The quantity of his urine in twenty-four hours was twelve pints. It contained sugar, and its specific gravity was 1031. The skin was always moist. After taking the creosote for about a month, his general health was improved, and the urine diminished in quantity, but increased in specific gravity to 1037. The farther history of the case is not known, and the patient died in two months after the time the above observations were made.

The fourth patient was a young man in the North London hospital, who took eighteen, and latterly twenty drops of creosote, three times a-day. His health was improved, and his urine reduced in quan-

tity from thirteen to seven pints, in specific gravity, from 1037 to 1030.[1]

Epilepsy.

Dr. Elliotson tried creosote in epilepsy. He found it sometimes do harm, and where it seemed beneficial at all, it only served to render the fits less frequent and in some instances, to produce a tranquillizing effect.[2]

Neuralgia and other forms of Nervous excitability.

Dr. Elliotson observing the soothing effects which creosote had on epileptic patients, resolved to make a trial of it in neuralgia and other forms of nervous excitability.

The first case in which he tried it, was that of a young girl twelve years of age, who was subject to attacks of severe spasm in the abdomen, twitchings in the legs and arms, attended by severe pain in the lowest part of the abdomen. At first the attacks were irregular in their recurrence, but at length she was seized every morning in the manner above mentioned. The pain she suffered was excru-

[1] Medico-Chirurgical Transactions of London, vol. xix. pp. 132-135.

[2] Same Memoir, p. 221.

ciating, and her face was expressive of the most intense agony. She generally continued in this state during the whole day, and then fell into a comatose state, in which condition she lay till morning. Her bowels were in a state of habitual and obstinate constipation, and she made water only once in twenty-four hours; but both the urine and alvine discharge were natural in appearance. Every known remedy had been tried in the country, and Dr. Elliotson despaired of being able to afford her any relief. He found that three grains of muriate of morphia alleviated her sufferings a little, but in so slight a degree that he discontinued it.

She was ordered a drop of creosote three times a-day, and the dose was gradually increased to seven drops. In the course of a month she was completely cured of her disease, and left the hospital in perfect health, having also regained her flesh.

The second case was that of a man afflicted with neuralgia of the posterior dental and nasal twigs of the superior maxillary nerve, causing dreadful pain, and sympathetic contortions of the features. On the 22d of August he began to take creosote in doses of three minims thrice a-day. The dose was afterwards increased to six minims; and on the 28th he was better for the first time. The dose of creosote was gradually increased to eighteen minims. The patient steadily improved, and in a short time

was quite well. It is necessary, however, to state, that he had been similarly affected three years previously, and recovered without any medical aid; but viewing the case in connexion with others, and knowing the powerfully anodyne properties of creosote, there seems every reason to attribute the cure in this instance to the remedy employed; and Dr. Elliotson has found it equally successful in several very similar cases of neuralgia, but the particulars of which are not published. He does not pretend that it is an infallible cure in this class of diseases, but considers that it ought to have a high place among the other medicines which are found useful; and from the cases just mentioned it appears, that when they all fail creosote may accomplish a cure. In such a disease as neuralgia, the offspring of so many different causes, no one remedy can be expected to prove a specific; and every individual case will probably be found to exhibit some peculiarity, requiring a corresponding modification in the treatment. Dr. Elliotson conceives, that it is in rheumatic neuralgia, not inflammatory, that creosote is most successful.

Dr. Elliotson says, " In that morbid tenderness of the surface of the body which appears so nearly allied to neuralgia, and which so often occurs in females, he has not seen it of any use. In common hysteria, unconnected with inflammatory con-

dition of any part, he has often seen it considerably lessen the disease; the more rare and strange forms of hysteria have yielded to it; and the morbid excitability of those who are called *nervous persons* he has frequently seen abated by it in a remarkable manner. In the latter description of persons, however, it is better to begin with no more than half a drop, as occasionally more at first produces excitement of the head. Palpitation, depending upon mere morbid excitability of the heart, has yielded to it far more than to other remedies."[1]

Power of arresting Vomiting. Its efficacy as a Tonic.

Of all the various uses to which creosote has been applied in medicine, there is none where it has been found so important, as in vomiting from nervous excitability and independent of any organic disease of the stomach. As a remedy in such cases it excels all other known medicines. This application of creosote was accidentally discovered by Dr. Elliotson, from observing that when given in cholera it arrested the vomiting, though the liquid stools, and the fatal termination of the disease were not averted. Dr. Elliotson states that he has never seen it fail in arresting

[1] Medico-Chirurgical Transactions of London, vol. xix. p. 224.

vomiting when it proceeded merely from functional derangement. Dr. Shortt who has tried it in about a dozen of cases of this kind, has found it equally successful, and it has proved as efficient in the hands of Dr. A. T. Thomson of London, Mr. Bodington of Erdington in Warwickshire, and several other gentlemen who I am aware have used it in private practice, but who have not published the result of their experience. There does not seem to be any notice in the continental journals of creosote having been used by foreign practitioners as a remedy in vomiting.

Mr. Taylor, apothecary of the North London Hospital, has published a list of cases, in which Dr. Elliotson administered creosote in vomiting, of which the following is an abstract.

Case 1.—11th Nov. Colica pictonum.—The patient complained of spasmodic pain of the stomach, and vomited every thing she took. No signs of gastritis. Creosote two minims; Mucilage a drachm; Water one ounce. To be taken every four hours. 12th, The vomiting and pain quite gone. 14th, Has vomited once. Dose of creosote increased to four minims. 15th, Vomiting has not returned.

Case 2.—Colica pictonum.—All medicines were rejected till the creosote was given, after which this never took place.

Case 3.—Spasmodic pain in lower part of abdo-

men, with great constipation and vomiting. All medicines were rejected. Ordered a draught, containing two drops of creosote before taking pills containing croton oil. She took three of them before the bowels weremoved, and was discharged cured in a few days.

Case 4.—The patient could not retain pills containing croton oil which she was ordered, unless she took two minims of creosote before each dose. This prevented the sickness, and the bowels were soon relieved.

Case 5.—Vomiting in a supposed case of painter's colic, which was relieved by doses of three drops of creosote every three hours.

Case 6.—Attacks of colic, attended with constipation and vomiting. The patient was distressed with constant sickness. He was ordered a drop of croton oil, and creosote according to circumstances, by which means the sickness was stopped very speedily.

Case 7.—An hysterical patient admitted November 1st, who complained of burning pain at the epigastrium, and a sense of heat extending up the œsophagus. She vomited every thing she took, and had occasionally regular paroxysms of hysteria. She had been ill for eighteen months, and attributed her illness to a moral cause. She was ordered three minims of creosote thrice a-day, and colocynth to keep the bowels open. On the 2nd the sickness

continued severe, but was a little relieved. The dose of creosote was increased to six minims. On the 4th the sickness and pain were better. On the 22nd, with a view of relieving the hysteria, a drachm of carbonate of iron three times a-day was prescribed to be taken after the creosote, and with the same view the dose of creosote had been previously occasionally increased at intervals. She had before coming into the hospital attempted to take the iron, but it was uniformly rejected. In conjunction with the creosote, however, the stomach bore it very well. The dose of the iron was gradually increased to half an ounce, and that of the creosote to fifteen minims. She continued to improve, and was dismissed on the 22nd of December, free of sickness, and in other respects almost well.

Case 8.—Hysteria.—The symptoms very similar to the former case. She was ordered a drachm of carbonate of iron thrice a-day, and a minim of creosote for the sickness when required. These doses were subsequently increased. The symptoms were all relieved, but the pain and sickness returned occasionally. The latter was always removed by the creosote, and it relieved the pain more than any other medicine.

Case 9.—Anasarca, ascites, and it was also supposed disease of several of the abdominal viscera.—The man was distressed with constant nausea and

vomiting. He died twelve days after admission into the hospital, but had no vomiting during that time, and he continued to take the creosote up to the time of his death.

Case 10.—The patient had for the last four years vomited his food almost immediately after swallowing it, and latterly his medicines, with the exception of creosote, which was the last medicine he took before coming into the hospital. He appeared quite well and did not complain of pain in the stomach, and there was but slight tenderness over the epigastrium. He was in the habit of knitting his brows occasionally, and complained of giddiness, but not of pain in the head. In this instance neither creosote nor prussic acid did the least good. At one time the patient took ninety drops of creosote in less than half a day without the development of any bad symptom. It was at first ordered in doses of a drop.

Case 11.—Phthisis and diarrhœa of two years standing.—The compound powder of kino having ceased to controul the purging, sulphate of copper was ordered, which had to a certain extent the desired effect, but made the patient sick. To relieve this, he was ordered to have a draught, containing two minims of prussic acid, ten minutes before taking the sulphate of copper pills. These draughts at first removed the sickness, but having afterwards

lost their influence, creosote was given, when the nausea was again subdued.

CASE 12.—Chronic bronchitis, with symptoms of incipient phthisis.—The patient was ordered sulphate of iron as a tonic, which produced vomiting. Two drops of creosote were ordered every six hours. The first dose stopped the vomiting, and it did not return for three days, when upon increasing the dose to four drops, it was permanently cured.

The particulars of the remaining cases are not published, but those detailed are sufficient to show the success with which creosote has been given in vomiting by Dr. Elliotson. In the same communication to the Lancet, from which the above cases are abridged, seven more are enumerated, in which it was administered to relieve nausea or vomiting caused by taking the hydriodate of potash. In all it proved perfectly successful.[1]

In a severe case of vomiting, apparently from arsenic, Dr. Elliotson states that he has known it succeed astonishingly, and in the limited number of cases of sea-sickness, in which he had an opportunity of trying it, the desired relief was attained. He also prescribed it with equal benefit in a case of vomiting from pregnancy.

I had lately an opportunity of trying it in a case of the last description, and the effect was most ex-

[1] Lancet, August 15th, 1835, vol. ii. p. 625.

traordinary. The patient was a woman about forty years of age, in the family way for the thirteenth time, and who had during her three previous pregnancies been troubled with fits of vomiting, occurring generally at stated periods, two or three times a day; and she stated that on these three last occasions she had miscarried. Being informed of this case by a friend who had the charge of her, I requested permission to try creosote, to which he consented, stating at the same time that he did not believe it would be of the least use. She was ordered three drops of creosote, thrice a day, diffused in water by means of mucilage. She took the first dose about an hour before her usual attack of vomiting was expected, and since that time she *never vomited*, and rapidly improved in health. During the first day on which she took the medicine, she had slight nausea, but that also was entirely cured in the course of a few days by persevering in the creosote, without increasing the dose. There is every reason to anticipate that creosote will prove useful in vomiting caused by pregnancy, not only from the instances in which it has been tried with success, but from a consideration of the nature of the cases in which more extensive observation has established its efficacy. Should this hope be realized, a very great desideratum will be supplied, for at present this most distressing and very common

symptom attendant on pregnancy, is considered little, if at all under the controul of medicine.

Dr. Bodington has published two very interesting cases in which he administered creosote successfully in vomiting. The first he describes in the following manner: "Mrs. S., a young married lady, the mother of one child, experienced a most difficult labour about two years since, the operation of 'turning' having been resorted to, in consequence of an unusual presentation. She has since suffered from relaxation of the uterine system, irregular menstruation, hysteria, and constant sickness, and, on one or two occasions, from uterine hemorrhage; but the most distressing of her complaints has been an almost daily vomiting of food, some hours after taking it, at intervals of two, four, six, or eight hours, the food always returning in an undigested mass, whatever length of time may have elapsed from the period of taking the meal. Thus the dinner, taken at two o'clock P. M., would frequently remain on the stomach until four A. M., and then be rejected in the same state as when taken, the only change being that produced by mastication. She complained also of a sensation of tightness and constriction across the chest, headache, and so much dimness of vision, as to amount almost to blindness; her countenance looked bloated and pale, the pulse was small and feeble, and she had a constant feeling

of weariness and prostration of strength. She had been for some months under medical treatment without benefit. She visited Cheltenham in the course of the last summer, and consulted some of the most eminent medical men there, with no better result."[1]

She again came under Dr. Bodington's care, when he prescribed a mixture of six drops of creosote and a little mucilage in six ounces of water. After taking two large table spoonfuls of this mixture, a remarkable change for the better took place, and she had no sickness for a whole day and night, which had not previously been the case for six months. The catamenia came on shortly afterwards in a more copious and natural flow, and all her bad symptoms seemed moderated, to such an extent indeed, that Dr. Bodington describes her being cured as it were by magic. She having discontinued the use of the medicine on account of its nauseous flavour, the bad symptoms reappeared, when she was again prevailed upon to resume it, one drop being combined in the form of pill, with three grains of an aromatic confection. After a few days she was again relieved, and remained perfectly well.

The other case published by Dr. Bodington, occurred in an infant eleven months old. The vomit-

[1] Lancet, January 30, 1836, vol. i. p. 694.

ing proceeded from suspension of the process of digestion, and had continued daily for a month, resisting all means employed to subdue it. The infant was completely cured after taking one drop of creosote in an ounce and a half mixture, a tea spoonful having been given three times a day.[1]

From what has been stated, it appears that creosote possesses an almost specific curative effect in vomiting arising from nervous excitability of the stomach, produced by various causes; but there are cases of vomiting in which much mischief and no good will result from its exhibition. When there are any symptoms of gastritis, it should never be given. This is the opinion of Dr. Elliotson, and Dr. A. T. Thomson. This latter has published a case of hysterical vomiting, complicated with inflammation of the stomach, in which decided injury was the result of the administration of creosote. It was not ordered by the Doctor himself, but by the house apothecary, under the impression that it would relieve the hysterical symptoms, which it did to a certain extent. Dr. Thomson, in the course of his clinical lecture upon the case, made the following remarks to his students. "You have heard, that during the progress of the disease, symptoms of hysteria were experienced by our patient;

[1] Lancet, January 30, 1836, vol. i. p. 695.

and these are often the most distressing of the minor symptoms of gastritis. The globus hystericus is undoubtedly spasmodic; and consequently it was likely to yield to such a stimulant narcotic as the creosote; but it is important not to allow the relief in this instance to mislead you into an opinion, that it may be given with impunity for removing those hysterical symptoms during the continuance of the active period of the disease. Nothing would prove more injurious in my opinion, than a dose of creosote during the inflammatory stage of the disease; and there is much reason for thinking, that it has again renewed the inflammation of the gastric surface.[1]

There are cases in which the stomach is in a peculiarly irritable state in hysteria, where the symptoms closely simulate those indicating gastritis, and yet there is no inflammation. As such, we must consider Dr. Elliotson's seventh and eighth cases. Dr. Roots of St. Thomas' Hospital, also mentions a case of a similar kind. Believing it possible that there might be some insidious inflammation, he applied some leeches, but on the following day, his scruples being removed, he ordered her some creosote, which, on the dose being increased from one drop to three, speedily allayed the irritability of the sto-

[1] Lancet, Feb. 21, 1835, vol. ii. p. 744.

mach, which convinced Dr. Roots that it was not a case of gastritis, for he adds, "I never yet saw creosote taken into the stomach, where there was any thing like inflammation existing, without its producing either increase of vomiting or increase of pain, or heat in the stomach speedily after it had been taken. I was in fact confirmed in my original opinion, that this was a case of hysterical vomiting."[1] Dr. Elliotson says, that "where structural disease exists in the stomach, the diseased surface may not bear such a stimulant except in the minutest quantity; and a minute quantity, even should it arrest the vomiting, is very likely to aggravate pain."[2]

From the great extent of Dr. Elliotson's observations on the effects of creosote on the stomach, and from the deliberate manner in which he draws his conclusions, there can be little doubt of their usual accuracy. But the statement which he makes is not applicable to every case; for in Dr. Shortt's case of cancer of the stomach already alluded to at page 93, the patient was relieved both of the pain and vomiting, by means of creosote. Perhaps, when disease of the stomach is suspected, it would be better to administer the creosote by means of inhalation. This may be done by breathing over a piece of paper

[1] Lancet, Dec. 26th, 1835, vol. ii. p. 492.

[2] Medico-Chirurgical Transactions of London, vol. xix. p. 227.

steeped in it, or by inhaling its vapour mixed with that of water, from Mudge's inhaler.

In Dr. Elliotson's eleventh case, we find creosote stopping the vomiting after prussic acid had lost its power. Dr. Elliotson, who has written an interesting work upon the effects of Prussic Acid in Affections of the Stomach, and has had ample opportunities of observing the comparative value of these two substances in the treatment of vomiting, believes that creosote has in a superior degree the property of enabling the stomach to bear medicines which have an emetic tendency, such as the sulphates of copper, zinc, and iron, hydriodate of potass, &c. &c. And in cases where both have failed, separately he has found advantage from their combination. Prussic acid is to be preferred to creosote in those cases where the patients have a strong dislike to the creosotic odour; this, however, may be almost entirely removed by prescribing it in the form of pill or bolus with an aromatic confection, as was done by Dr. Bodington. From the tendency which creosote has to act as a local stimulant, it is not so proper a remedy as prussic acid where there is disease of the stomach. It has this advantage, however, over the latter, of not being liable to the same uncertainty of activity, owing to the different strengths of which prussic acid is

prepared, and from its liability to spontaneous decomposition.

Dr. John Walker, of Glasgow, has published a case which he says is "illustrative of the non-efficacy of creosote in allaying spasmodic or neuralgic pain of the stomach, and vomiting, without inflammation of that organ." From the strain in which his communication is written, he seems to cast some degree of discredit upon the testimonies which Dr. Elliotson has given as to the power of creosote in such cases, but how an isolated observation can throw the remedy into discredit it is difficult to imagine, when its real value is attested in the fullest and most satisfactory manner by extensive trials in public hospitals, where the treatment is subject to the scrutiny and criticism of numerous individuals. Dr. Walker's case then can only be regarded as an instance of idiosyncracy, and as such, from its extreme singularity in many respects, is peculiarly interesting. Dr. Walker describes the case in the following manner:

"A. B., ætat. 22, an unmarried female. Has for the last three years complained of acute pain along the whole spinal column, greatly increased on motion or pressure, and accompanied by two lateral curvatures, describing, in all, the letter *S*, and including all the dorsal and lumbar vertebræ. There

is no paraplegia; the uterus, bowels, urinary organs, &c. perform their functions regularly; the skin generally feels natural, and there is always some degree of appetite. Among the numerous symptoms under which this patient labours, the most distressing is constant vomiting of all ingesta, of whatever temperature or kind, and generally from two to twenty minutes after they have been taken. This vomiting of food is attended with considerable pain; but frequently violent retching takes place when no food has been taken, and which is attended by violent spasmodic pain of stomach, generally continuing from twelve to twenty-four hours after the retching has ceased.

"As every justifiable means had already been resorted to for the alleviation of the spinal affection (which in this case arises from mere relaxation of the ligaments, &c.) without the slightest benefit, and the vomiting being not only the most troublesome symptom, but precluding all possibility of improving the general health, and as nothing had hitherto tended in the slightest degree to check it, I felt inclined to try the creosote. It was, therefore, given according to Dr. Elliotson's plan, in doses of two drops in mucilage and water every six hours, but without effect. Next day it was increased to four drops, and in this quantity the first dose produced headache, and increased the vomiting and pain of

stomach. The same quantity was again exhibited at the end of six hours, which only aggravated the former symptoms, and a short time after the administration of the third dose the headache became agonizing; countenance flushed, with great heat of surface; retching and pain of stomach very severe. It also acted powerfully upon the bowels, producing six watery stools the first hour, with severe griping, likewise inducing painful micturition, and imparting to the urine a strong creosotic odour.

"The medicine was now intermitted for twenty-four hours, and again commenced in the same doses, but in combination with twenty drops of solution of mur. of morphia, when the symptoms induced were as violent as formerly, with the exception of the diarrhœa. Being still inclined to give the medicine a fair trial, it was again omitted for twelve hours, and afterwards exhibited when neither vomiting nor pain of stomach was present, and in doses of only one drop every six hours. The second dose produced violent and immediate vomiting, with severe pain of stomach."[1]

The most remarkable effects produced by the creosote were the watery stools, griping, and painful micturition; but the manner in which the bowels were acted upon is the most peculiar feature of the

[1] Lancet, December 19, 1835, vol. i. p. 447.

case. The headache, flushing of the countenance, and increased vomiting, are phenomena caused by the medicine in over doses, and it is possible, that had it been administered in extremely minute quantities, the desired result might have been obtained, for there is a very great diversity in individuals as to the dose they are able to bear. Dr. Elliotson states, that in some instances he has seen the fraction of a drop give rise to the physiological consequences just mentioned. Dr. Walker admits, that to a certain extent, the vomiting was caused by the affection of the spinal column and nerves. This case, then, must be looked upon as altogether peculiar; and to argue from it that creosote ought not to be exhibited in vomiting independent of disease of the stomach, would be as unreasonable as to assert that mercury should never be used as an alterative, because cases occasionally occur in which a single small dose produces salivation and violent constitutional effects. The non-efficacy of creosote in Dr. Elliotson's tenth case must also be referred to idiosyncrasy. Dr. Elliotson states that he has only seen two other such cases in which the vomiting was the disease and not the symptom, and in which creosote failed. In one of the instances he remarked, that the patient, as in the case of the boy already mentioned, occasionally complained of giddiness and pain in the temples.

Pulmonary Diseases.

Creosote has been pretty extensively tried in affections of the lungs and air-passages. Reichenbach employed it in hemoptoe, and if we can depend on the correctness of his statements, it is a useful remedy in this disease. A phthisical patient who had for six days been spitting blood, and who was at the same time affected with fever, great pain, and difficult respiration, was cured in four days, by taking daily during that period, five drops of creosote. In twenty-four hours after he began the use of the medicine, the spitting of blood was subdued, the pain ceased, respiration became more easy, and the fever disappeared. In another case of a similar nature, he accomplished as striking and as rapid a cure.

Creosote has been strongly recommended by Reichenbach and other continental physicians[1] in all the various forms and stages of consumption; but the more recent observations of Professor Wolff and Dr. Elliotson, seem to point out pretty clearly, that it is a remedy which ought not to be given in that disease. Wolff found that its use di-

[1] Bulletin Général de Thérapeutique, 1834, p. 384, &c. Miguet sur la Créosote.

minishes the quantity of urine, producing at the same time a greater disposition to colliquative sweats, and thus tending to complicate the original disease with dropsy. In one of his cases, the use of the creosote was discontinued on account of the violent vomiting which it produced.[1] Dr. Elliotson believes, that although creosote is no cure for tubercles, it may be useful when there are only one or two ulcers in the lungs, and no tendency to their farther promotion. He states, that through its agency, a young gentleman, with a solitary cavity in his left lung, completely recovered, so that not the slightest morbid wound could be detected.[2]

In cases of increased secretion from the bronchial tubes, without inflammation, and in asthma, depending on morbid excitability of the mucous membranes of the bronchiae, it has been found of eminent service. I tried the effects of inhaling its vapour along with that of water, when lately labouring under a pretty severe catarrh. I think it tended to remove the uneasiness which was before considerable. It certainly promoted expectoration, and unquestionably did me no harm.

[1] Medicinische Zeitung vom vereine für Heilkunde in Preussen, 1834, No. 30.

[2] Medico-Chirurgical Transactions of London, vol. xix. p. 221.

NOTE ON EMBALMING.

Having happened accidentally to look into the Asiatic Journal to-day, I was pleased and surprised to find there views regarding the embalment of the Egyptians briefly expressed by Colonel Bagnold, very similar to those stated in this Essay. Though he makes no allusion to creosote, yet from the great community of ideas in other respects, it is necessary to vindicate myself from plagiarism, to mention, that my Essay was given in to the Harveian Society on the 1st of January, and that the number of the Asiatic Journal, from which the following passage is quoted, did not appear till February.

Proceedings of the Royal Asiatic Society, held 2d January 1836. —Lieut.-Colonel M. E. Bagnold, presented "a human hand, and a piece of beef, preserved by means of a preparation of vegetable tar found on the borders of the Red Sea, in the vicinity of Mocha; and a specimen of the tar.

"The Secretary read a letter, referring to the above, addressed to him by Colonel Bagnold, from which the following passages are extracted:

"'During my residence as Political Agent on the Red Sea, a conversation with some Bedouin Arabs, in the vicinity of Mocha, led me to suspect that the principal ingredient used by the ancient Egyptians in the formation of mummies, was nothing more than the vegetable tar of those countries, called by the Arabs *katrán*. My first trials were on fowls and legs of mutton; and which, though in the month of July, and the thermometer ranging 94° in the shade, succeeded so much to my satisfaction, that I forwarded some to England; and have now the pleasure to send for the society's information and inspection a human hand, prepared four years ago by my brother, Captain Thomas Bagnold. The best informed among the native Arabs think that large quantities of camphor, myrrh, aloes, and frankincense, were used; these specimens will, however, prove that such were by no means necessary, as the tar, when applied alone, penetrates and discolours the bone. The only use now made of this tar, in Arabia, is as a plaster or ointment for sore backs of horses and camels; rot in the feet of sheep; and, lastly, in the preparation of the heads of criminals sent from the distant provinces to the seat of government. The tar is obtained from the branches of a small tree, or shrub, exposed to a considerable degree of heat, and found in most parts of Syria, and Arabia Felix.'

"The hand in question, though perfectly black, has little of the shrivelled and distorted appearance of a mummy." *Asiatic Journal for February* 1836, p. 134.

March 9, 1836.

APPENDIX.

No. I.—p. 57.

In Brosely, Bentley, Pitchford, and other places adjacent in Shropshire, there lies over most of the coal-pits or mines a stratum or layer of a blackish rock or stone, of some thickness, which is porous, and contains in it great quantities of bituminous matter.

The stone being brought to the work-house, is ground small by horse-mills, such as are used for grinding flints to make glass of; the powder is thrown into great coppers of water, where, by boiling, the bituminous matter is separated from the stony or gritty, this last sinking to the bottom, the other swimming at the top of the water.

This bituminous substance being gathered together and evaporated, comes to the consistence of pitch, and with the help of an oil distilled from the same stone, and mixed with the pitch, comes to be thinner, or like tar; the uses of both which materials, either for shipping or otherwise, these substances are said to supply, nay even go beyond. And this has been tried on several boats this three or four years past, and does not crack as the ordinary pitch or tar, but always keeps black and soft, and therefore is proposed to hinder the worm from getting into the ships pitched with it.

There is likewise distilled from this stone an oil, which may be used for oil of petre or turpentine, and has been tried by divers persons in aches or pains.

In the valley called Liberthal, near Geesbach, (an ancient mine work in Alsatia), there runs out of a cavern a foul, fattish,

oily liquor, which affords an excellent balsam, by taking a quantity of it, and putting it in an earthen pot well luted, that no steam may exhale; and then with a gentle fire at first, but a stronger afterwards, boiling it for three hours together, in which space it will boil in a fourth part, and an earthen matter, like pitch, will settle itself at the bottom; but on the top thereof, when cold, there will swim a fatty substance, like line oil, limpid, and somewhat yellowish, which is to be decanted from the thick sediment, and then gently distilled in an alembic in arena; by which means there will come over two differing liquors, one phlegmatic, the other oily, which latter swimming on the phlegm, is to be severed from it. The phlegm is used as an excellent resister and curer of all the putrefactions of the lungs and liver, and it heals all foul wounds and ulcers. The oily part, being diluted with double its quantity of distilled vinegar, and brought three times over the helm, yields a rare balsam against all inward and outward corruptions, stinking ulcers, hereditary scurfs and scabs. It is also much used against apoplexies, palsies, consumptions, giddinesses, and headaches. Inwardly they take it with succory water against all corruptions of the lungs. It is a kind of petroleum, and contains no other mineral juice but that of sulphur, which seems to be thus distilled by nature under ground, the distillation of an oil out of sulphur by art not being so easy to perform. *Abridgement of Phil. Trans.* vol. ii. pp. 459, 460.